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THE

ASSURANCE MAGAZINE,

AND JOURNAL OF

THE INSTITUTE OF ACTUARIES.

On the true measure of Liability in a System of Direct Taxation. *By* CHARLES JELLICOE, ESQ., *Fellow of the Institute of Actuaries.*

CONSIDERING the repeated discussions which have taken place on the question of the Income Tax, it is not a little surprising that the true understanding of it has not made greater progress. After all that has been said to demonstrate the injustice and unequal pressure of the tax as at present levied, the perseverance of some portion of the press, and of one or two persons of considerable reputation as regards their understanding of such matters, in the opposite opinion, is quite unaccountable. It will be seen by the Second Report of the Committee of the House, just published, that some still maintain that the taxing a temporary annuity at the same rate as a perpetuity is perfectly fair and equitable, because, as they are at great pains to show, the present value in each case is mulcted in the same ratio. It is, at all events, satisfactory to find that these authorities so far admit that "present value" is the proper thing to tax. They maintain, in fact, that in these cases a property tax and an income tax have an identical operation; and as they approve of the one, they must clearly give their sanction to the other. But, unfortunately, the identical character of the two does not hold good, in spite of the assertion of these gentlemen to the contrary; they do not observe that in the case of the temporary annuity the wave of taxation having once passed over, must, to make their argument good, leave it ever untouched thereafter, let the capital out of which it arises reappear in what shape it will: otherwise it is clear that such capital is liable to be taxed over and

over again. This alone is fatal to their proposition, independently of the absurdity of the stipulations which they acknowledge must be maintained—of an unvarying rate of taxation, and a perpetual duration of it. Could a holder of the Long Annuities be satisfied that the capital he might save out of them would be tax-free after 1860, he would not, probably, see the justice of being called upon to discount in the interval the payments which, in his neighbour's case, might be spread out through an eternity, or which after a time might cease to be demanded of him at all. But it is surely unnecessary to dwell upon these misstatements further.* There is in reality nothing to defend the practice of assuming income as a measure of liability. It was no doubt done in ignorance at first; and it has been persevered in for no other reason than that it has been hitherto patiently submitted to.

The true theory of direct taxation is, like most other things that are true, very simple: men associate themselves together for their common advantage, appoint a ruling power, and agree to supply it with the necessary means for its maintenance; a given sum is wanted at a given time, not for protection merely, but for carrying on during a certain interval—say, for six months before the levy and six months after it—all the functions of government. What, then, is more evident than that to divide the burden fairly each individual of the community should be called upon to contribute a like proportion of his possessions at the time of the levy —to surrender, not a portion of what he may be receiving in the year, or of this or that item, but a tenth part, or a hundredth part, as it may be, of what he is then actually worth? There is evidently no other *measure of liability* which is perfectly equitable but this; for either the whole property must be the measure, or a part of it; but the latter cannot be a fair indicator unless it be a like portion in every case, and then the result would be the same as would arise from taking the whole.

The relative liability of each individual might thus be measured by the fraction $\frac{p}{P}$, P being the total property taxed, and p that of the individual; and if s be the sum to be raised, then $\frac{p}{P} \times s$ would represent the contribution to be made by each, and $\frac{s}{P}$ the rate of such contribution. Now this last fraction must always, from the nature of the thing, be small, and hence one great

* A complete refutation of them will be found in the Second Report of the Income and Property Tax Committee, just published.

advantage of such a system; for it follows from this that the value of $\frac{s}{P} \times p$ will vary very little, though considerable changes take place in p; in other words, no part of the tax properly payable could be evaded without such a diminution of property as could scarcely fail to be detected. To make this quite clear (for it is a very important consideration): the suppression or concealment of £100 of income under the present system subjects the Government to a loss of £2. 18*s*. 4*d*.; now if the tax were an equivalent one of 1*s*. 9*d*. per cent. upon property, the concealment of the latter must amount to £3,333 in value before the same loss of £2. 18*s*. 4*d*. could be incurred. Taking into account, then, the fact that property is of a character so much more PATENT than income, it will be seen that evasion under a genuine property tax would be next to impossible.

Another advantage in such a mode of taxation is that it cannot be evaded as the duties imposed by the Customs, or Excise, or the assessed taxes can, by non-usage of the article taxed. I have seen this brought forward as a great merit of indirect taxation, viz., that those who wish to avoid any payment may do so by such non-usage. But this is in truth one of the most objectionable features in it, for the rich may frequently by this means escape the contribution which it is their duty to make, whilst the poor, having no substitute to resort to, are mulcted to the uttermost. I am aware that objections have been raised to this direct taxation of property on the score of its being a prejudicial interference with capital; but the objections have no weight, and scarcely any meaning. If money must be paid to the State, the more the transaction can be simplified, and the more clearly its nature understood, the less annoyance and embarrassment will eventually be occasioned. It is one of the worst characteristics of indirect taxation, that the mischievous consequences arising from its interference with the free interchange or manufacture of produce are almost wholly concealed. It is true that the revenue raised by its means is extracted from the pockets of the consumer almost without his knowledge. But this in itself is objectionable. A rational people should know precisely what is required, and on what principle the share of each in the assessment is determined; and being satisfied that the one is necessary and the other just, there is no reason at the present day to doubt but that the required contribution would be cheerfully made. The writers on this subject, one and all, lose sight of the fact that the thing sought in these inquiries is the

"*measure of liability,*" and that when the property of a man is selected as this measure, it is no more interfered with than his height would be were that made the test in every case.

It may be urged, that efforts will be constantly made to render property of less apparent value, with a view to diminish the liability, and that this will produce the effect so much deprecated. But I have already shown that such a proceeding can never be attended with a degree of success sufficient to warrant it. A man may get rid of his dogs, or put down his carriage, or cease to drink wine, and thus throw the burden of such taxation on other shoulders; but he is not likely to seek this end by destroying his house, or throwing his money into the sea, and it is clear that under a genuine property tax nothing short of alienation will be effectual.

To make this system consistent and complete, it is obviously necessary that no kind of property should be exempt. The mere fact of its being unproductive does not affect its value as determined for the purpose in question. There can be no reason for exempting the owner of property because he chooses to hold it in one shape instead of another. The distinction is purely arbitrary. The simple question in every case should be, what is the "cash value" of the whole, or into how much current money can it be converted? This taken as the measure of liability necessarily puts all upon precisely the same level, and the sacrifice made by each is exactly proportionate. It is this species of sacrifice too which is, I would contend, the only true one, and not that of the description advocated in some of the evidence taken before the Committee. It is the foregoing of a portion of the power which each individual has possessed himself of, over the conveniences and luxuries of life, and which power the organization he is at intervals called upon to support has enabled him to acquire. The sacrifice made by each member of the community being, then, in one given ratio, the relation in which each stands to each is never disturbed, be the rate of taxation what it may; and it is this quality as much as anything which illustrates the truth of the proposed system. Another illustration of it may be given whilst exposing the fallacy of a proposition advocated in the Committee for making the expenditure of the individual the test of his liability. Were such a plan adopted, the relative liability might be denoted by the fraction $\frac{e}{E}$, where E is the total expenditure of the population, and e that of each member of it, and the actual liability in each case would be found by the proportion

$$E : S :: e : \frac{e}{E} \times S.$$

Now it will at once be seen that the factors in this expression are incongruous, the one simply representing a sum in ready money, the other expenditure; whereas in the expression for the true liability, viz., $\frac{p}{P} \times s$, the relations are strictly analogous, the ready money required consisting, in fact, of portions of the property of the whole country converted in effect into ready money. But independently of these considerations, it must surely be admitted that the founding taxation upon expenditure merely, has nothing to justify it. The allowing the individual to escape because he does not choose to exercise the powers which he is in possession of is much on a par, and indeed is almost identical with, the exempting unproductive property; in either case the £100,000 in gold or notes is to contribute nothing, and the making a contribution, which it is the duty of every member of the community to make in proportion to his means, or by some rule or other, depends simply on his own will, and can with ease be evaded altogether, much in the same way as may be done under most forms of indirect taxation. Indeed, in a practical as well as a logical point of view, there is no "measure of liability" which can at all be put in competition with that which the whole property of individuals affords. It is more simple and direct than any other, its amount is easily arrived at, and even a very considerable error in the determination of it is immaterial; it enforces a contribution from those whose duty it is to make it, for such a "measure" can neither be concealed nor evaded; and if even it do not combine every element which should be introduced into a perfect system (which, however, I am by no means prepared to admit), its fairness and simplicity could not fail, were it once in operation, to render it popular, and to bring about changes of the greatest benefit to the commercial and manufacturing interests of the country. So much, then, for the "measure of liability:" the methods by which it is proposed to represent all kinds of income by it must form the subject of a future article.

But before dismissing the present one, it may be useful to show, as belonging to this division of the subject, what kind of alteration in the present Property and Income Tax enactment would effect the proposed change. Thus, in lieu of the clauses called Schedules A, B, C, D, and E, little more would be required than to substitute some such sections as the following:—

"And be it enacted, that as regards property of every description whatever, there shall be charged yearly in respect of the saleable or money value thereof at the time of the levy, for every one hundred pounds of such saleable or money value, the sum of one shilling and ninepence.

"And be it enacted, that in order to determine such saleable or money value in every case, the following modes of estimation be adopted: (that is say,) That all material objects, such as houses, lands, furniture, goods, chattels, plate, live and dead stock, &c., be estimated at such money value as competent assessors shall put upon them.

"That all rents, annuities, and dividends, *in perpetuity*, whether arising out of lands or tenements, or public or private securities, be estimated at 33·333 years' purchase of their net annual value.

"That all rents, annuities, and dividends, *payable for a term only*, arising as above, be estimated according to the duration of such term, at the number of years' purchase of their net annual value shown in the schedule marked A,* appended to this Act.

"That all rents, annuities, and dividends, *payable during the life of any individual*, arising as above, be estimated according to the age of such individual, at the number of years' purchase of their net annual value shown in the schedule marked B,† appended to this Act.

"That every other description of income, whether arising from a profession, trade, employment, or vocation, be estimated at three-and-a-half years'‡ purchase of the net annual value thereof, the net annual value in every case to be that which remains after deduction of such portions of the annual proceeds as partake of a doubtful, hazardous, or uncertain character."

Provisions to this effect, carefully constructed, and corresponding amendments throughout the present Act, would serve to bring about the required change; and should the amount raised exceed (as it no doubt would greatly) that produced at present under the operation of this tax, a corresponding reduction might be made in the duties payable through the Excise or Custom House, the one system thus gradually superseding the other. The reason why 3 per cent. is chosen as the rate of interest is that some securities would be found of so perfect a kind as to yield only that rate, so

* An ordinary table of the value of temporary annuities at 3 per cent.
† An ordinary table of the value of life annuities at 3 per cent.
‡ The reason for this will be explained hereafter.

that the annual proceeds of all others must be reduced to the same standard, it being obviously inconvenient, if not impracticable, to adopt an inferior standard, and to bring down first-rate securities to the lower level.

Although not acquiescing in all its details, I cannot conclude these few observations without paying a well merited tribute of praise to Mr. Hume's proposed Report. May he live to see its principles acted upon, and have the satisfaction of witnessing the beneficial results thence arising!

Remarks upon the present state of Information relating to the Laws of Sickness and Mortality, as exemplified in the Tables of Contributions, &c. used by Friendly Societies. By H. Tompkins, Esq.

[Read before the Institute of Actuaries, 28th June, 1852, and ordered by the Council to be printed.]

ONE of the most important problems of social statistics, after the questions of food and labour, is to determine the ratio of mortality and sickness.

The general mortality having been a subject of investigation during a long period, and the collection of facts and deductions therefrom being essential to the operations of the various respectable and long-established Assurance Companies, has at length been determined with sufficient exactness.

About the sixteenth century attention appears first to have been directed in this country to the subject of mortality; and from that period to the present time there has been a succession of tables, &c., ending with the valuable "English Life Table." This table was prepared from the facts supplied by the Registers of Deaths under the General Registration Act. The elements of all these tables, being similar, should assimilate in their results; therefore the comparison of one set of these facts with others has, in those cases where the information has been sufficiently extensive, proved the experience to be correct; and where not sufficiently extensive, attention has been directed to the parts which may still be considered doubtful, a more extensive collection of facts being necessary.

Allowing that a slight increase or decrease in the comparative goodness of life, or in public health, in different centuries, may be

occasioned by various outward circumstances, we think it may be assumed that the rate of "mortality" and the rate of "sickness," speaking generally, are *fixed* rates. All experiences, where sufficiently extended, and under similar circumstances, will converge, and no discrepancy of any practical importance will be found to exist.

With regard to the "*general* rate of mortality" this point appears to have been attained; but with respect to the rates of mortality in *particular* sections of the community, except in a few strongly marked instances, we have only instalments of facts, and they require considerable extension before they can acquire a practical value.

Such being the case, and the legislature having by the Act 13 & 14 Vict., cap. 115, and other Acts, directed the members of Friendly Societies to seek the advice and assistance of actuaries in framing their "Tables of Contributions and Allowances," we might expect to find that the data upon which such tables are computed would generally be similar, especially in societies and clubs of a similar character.

The tables of six Friendly Societies, EACH SIMILAR IN CHARACTER TO THE OTHERS, which have been prepared and certified by a different actuary in each case, and within the past three years, give the following varieties of data as regards "mortality":—

Age.	Number out of which One will die in each Year.					
	1	2	3	4	5	6
20	148	124	150	75	141	95
25	142	107	130	72	136	88
30	132	92	104	83	98	79
35	121	79	87	82	97	60
40	106	68	79	71	76	
45	89	59	69	66	67	
50	70	51	55	49	74	
55	52	44	41	37	55	
60	40	30	33	28	28	
65	..	..	..	..	24	
70	..	..	..	..	19	

From such conflicting data we cannot expect that the Tables of Contributions will be similar.

The following are extracts from tables that have been taken indiscriminately:—

The Contributions required for an Annuity of 10*s. weekly after* 65, *according to the Tables of different Actuaries.*

Age.	Monthly Contributions till 65.								Age.	Monthly Contributions till 65.							
	s.	d.	s.	d.	s.	d.	s.	d.		s.	d.	s.	d.	s.	d.	s.	d.
15	1	8	1	2¾	2	2		..	33	4	5½	3	5	5	2	3	0½
16	1	9	1	3½	2	3		..	34	4	9	3	7¾	5	6	3	3¼
17	1	10	1	4½	2	4		..	35	5	0¾	3	10¾	5	10	3	6
18	1	11¼	1	5¼	2	5	1	3	36	5	4¾	4	1¾	6	2	3	9
19	2	0½	1	6¼	2	7	1	3¾	37	5	9¼	4	5¼	6	6	4	0¼
20	2	1¾	1	7½	2	8	1	4¾	38	6	1¼	4	9	6	11	4	3¾
21	2	3¼	1	8½	2	10	1	5¾	39	6	7¼	5	1	7	5	4	7¾
22	2	4¼	1	9½	2	11	1	6¾	40	7	1	5	5½	7	10	5	0
23	2	6¼	1	10¾	3	1	1	7¾	41	7	7½	5	10½	8	4	5	5
24	2	8	2	0¼	3	3	1	9	42	8	2½	6	3¾	8	11	5	10¼
25	2	9¾	2	1½	3	5	1	10¼	43	8	10	6	8¼	9	7	6	4¼
26	2	11½	2	3	3	7	1	11½	44	9	6¾	7	4½	10	3	6	10¾
27	3	1¾	2	4¾	3	10	2	1	45	10	4¼	8	0	11	0	7	6¼
28	3	3¾	2	6½	4	0	2	2¾	46	11	3	8	8¼	11	11	8	2½
29	3	6	2	8¼	4	2	2	4¼	47	12	3¼	9	5¾	12	10	8	11¾
30	3	8¾	2	10¼	4	5	2	6¼	48	13	5	10	4½	13	11	9	10½
31	3	11½	3	0¼	4	8	2	8¼	49	14	8¾	11	4½	15	2	10	10¾
32	4	2½	3	2½	4	11	2	10¼	50	16	3	12	6½	16	6	12	0¾

The Contributions required monthly for an Annuity of 10*s. weekly after the age of* 70, *according to two Actuaries.*

Age.	Monthly Contributions till 70.				Age.	Monthly Contributions till 70.			
	s.	d.	s.	d.		s.	d.	s.	d.
15	0	7½	1	2	36	2	0	3	4
16	0	8	1	3	37	2	2	3	6
17	0	8¼	1	4	38	2	3½	3	8
18	0	8½	1	4	39	2	5½	3	11
19	0	9	1	5	40	2	7½	4	2
20	0	9½	1	6	41	2	9½	4	5
21	0	10	1	7	42	3	0	4	8
22	0	11	1	8	43	3	2½	4	11
23	0	11½	1	9	44	3	5½	5	4
24	1	0	1	9	45	3	9	5	8
25	1	0½	1	10	46	4	0	6	1
26	1	1¼	1	11	47	4	4	6	6
27	1	2	2	1	48	4	9	6	11
28	1	3	2	2	49	5	1½	7	6
29	1	4	2	3	50	5	7	8	4
30	1	5	2	5	51		..	8	9
31	1	6	2	6	52		..	9	6
32	1	7	2	8	53		..	10	4
33	1	8	2	10	54		..	11	4
34	1	9½	2	11	55		..	12	5
35	1	10½	3	1					

Profit is not an element in the construction of a Table of Contributions and Payments for a Friendly Society: the risk incurred

is to be covered without any other addition. We are, therefore, obliged to assume that the foregoing variations of data upon the same subject arise from the circumstance that, while the rate of mortality for the population at large has been ascertained tolerably correctly, and also the rate for the lives assuring in the various Assurance Offices, which form but a portion of the preceding, there is an excess of mortality remaining, to be apportioned either among the extreme ranks of life, to be distributed among particular localities, or to be divided among various trades, occupations, and circumstances existing possibly among our working population, causing the excess. The excess has not yet been clearly apportioned, for want of sufficient data; and in the formation of Tables of Contributions the best data which is obtainable has been adopted.

Until, however, the experience of FRIENDLY SOCIETIES with respect to *mortality* is obtained to a greater amount than at present exists, the knowledge of the rates of mortality occurring among the working classes which compose Friendly Societies will remain in the same unsatisfactory condition.

Passing from the consideration of the mortality occurring in Friendly Societies to the sickness, we find but few facts collected from which to deduce the laws respecting it. The cause of this is to be found in the circumstance that no Institution or Company insures persons against sickness; and therefore, with the exception of Friendly Societies, they have no interest in recording the amount of individual sickness. The collections of facts relating to sickness are consequently few, and of comparatively small extent, being contained in only FOUR collections. The Report of the Highland Society, Dr. Price's Tables, and others which are now rarely consulted for practical purposes, are omitted in this enumeration.

A collection of Returns of Sickness and Mortality was obtained by the Society for the Diffusion of Useful Knowledge, in 1828–9. This collection was arranged by Mr. Ansell; but notwithstanding the known talents of that gentleman, the comparatively small experience it contains prevents our regarding it in any other light than as a step in the right direction. The Report on Life Annuities, prepared by Mr. Finlaison, and presented to the House of Commons in 1829, contains a table on the extent and duration of sickness among the industrious classes, founded on the experience of a Society in London for the six years preceding Midsummer, 1827. The amount of experience of this London Society was not very extensive; and Mr. Finlaison, in a note, observes that—

"The London Society supplies no information after the age of 60. The three following periods (60 to 65, 65 to 70, above 70) are therefore *assumed* from the Highland Society's Report, which *is very likely to be correct* at these advanced periods; at least, no other information is extant."

The next collection of data relating to sickness was that obtained by Mr. Neison in 1840. This, to a great extent, corroborates the results obtained by Mr. Ansell up to about the age of 60. Although the experience in this collection is stated to be extended over 1,147,143 years, it appears to contain only the experience of about 200,000 persons, during a period of five years on the life of each. This collection, although valuable so far as it is correct, like the preceding, in bringing a greater number of facts to bear on the subject, cannot decide the law of sickness; the deductions from it, even if correct, require corroboration. We have to thank private enterprise for a great part of the information we possess on this important topic; but it is out of the reach of private resources fully to investigate the subject.

The next, and probably the most correct and best collection of facts relating to sickness among the working classes, is that received from the "Manchester Unity of the Independent Order of Odd Fellows," and prepared by Mr. Radcliffe. This confirms in a great degree the results of Mr. Neison's collection. At certain ages, in each collection, the mean annual quantity of sickness differs, and the comparison points out where one, or both, must be defective.

Here our materials are exhausted; and with this small quantity of data we think it is evident that a decisive law of sickness has not yet been obtained. The tables at present in use are merely pioneers, and will share the fate common to all first efforts to illustrate a subject hitherto enveloped in obscurity. An immense amount of experience as regards the duration of sickness must accumulate now that attention has been so generally drawn to the subject, and from it tables will be made that will supersede many of those now in use. It must be allowed, however, that up to about the middle of life the data tolerably coincide. Any tables of contributions for sickness from 20 years of age to 50 would not, perhaps, show any great discrepancies; but the experiences of the advanced ages differ so widely, that they constitute an element of discord throughout the whole table. The following are six varieties of data concerning "*sickness*," given by a different actuary in each case, as in the preceding data relating to "*mortality*":—

Average amount of Sickness annually experienced in each year.

Age.	Weeks.	Weeks.	Weeks.	Weeks.	Weeks.	Weeks.
20	·840	·70	·575	·83	1·000	·76
25	·874	·81	·585	·97	1·000	·76
30	·911	·94	·621	·94	1·000	·90
35	·984	1·08	·675	·98	1·214	1·04
40	1·181	1·26	·758	1·20	1·357	
45	1·494	1·46	·962	1·44	1·357	
50	1·960	1·70	1·361	1·97	1·428	
55	2·705	1·97	1·821	2·80	1·928	
60	4·166	2·90	2·346	3·91	3·000	
65	..	..	..	..	5·642	
70	..	..	..	..	16·571	

From the preceding data we are prepared to find variations in the scales of contributions. The following are the payments required, according to three different actuaries, to procure 10*s*. per week in sickness during life :—

Age.	Monthly Payments during Life.			Age.	Monthly Payments during Life.		
	s. d.	*s. d.*	*s. d.*		*s. d.*	*s. d.*	*s. d.*
15	1 3¾	1 3	1 6½	33	2 0¼	2 2¼	2 8
16	1 4	1 3¾	1 7	34	2 1	2 3¼	2 9
17	1 4¼	1 4	1 7½	35	2 2	2 4¼	2 10½
18	1 4½	1 4½	1 8	36	2 2¾	2 5½	2 11½
19	1 4¾	1 5	1 8½	37	2 3½	2 6¾	3 1
20	1 5¼	1 5½	1 9	38	2 4½	2 8	3 2½
21	1 5½	1 6	1 9½	39	2 5½	2 9¼	3 4½
22	1 6	1 6½	1 10	40	2 6½	2 10½	3 6
23	1 6½	1 7¼	1 11	41	2 7¾	3 0	3 8
24	1 7	1 7¾	1 11½	42	2 8¾	3 1¾	3 9½
25	1 7¾	1 8¼	2 0½	43	2 10	3 3½	3 11½
26	1 7¾	1 8¾	2 1½	44	2 11½	3 5½	4 1½
27	1 8¼	1 9½	2 2	45	3 1	3 7	4 4
28	1 8¾	1 10	2 3	46	3 2½	3 9½	4 6
29	1 9½	1 10¾	2 4	47	3 4	3 11½	4 9
30	1 10	1 11½	2 4½	48	3 6	4 2	4 11½
31	1 10¾	2 0½	2 6	49	3 8¼	4 4½	5 2½
32	1 11½	2 1¼	2 7	50	3 10½	4 7¼	5 5½

The legislature proceeded in advance of the age, and with greater celerity than usual, when it enacted, in 1819, that the tables of Friendly Societies' payments and benefits should be certified by actuaries, as at that time the data in existence could scarcely be considered of sufficient extent to justify their certifying to the correctness of Tables of Contributions, &c. It was enacted that the rules and tables should be "approved by two persons at least, known to be professional actuaries, or persons skilled in calculation as fit and proper:" but with the proviso, "according to

the most correct calculation of which the nature of the case will admit." In 1829 the former law was altered, the legislature withdrawing the power of certifying as to correctness of tables dependent on data which was meagre in quantity and uncertain in results.

In 1846 the old law in this respect was revived, with the alteration that the certificate of *one* "actuary" should be sufficient, and the addition of a more strict definition of the individuals to be comprised under that term. Under the Act of 1846, every Society or Club, depending on the laws of sickness or mortality, was required, before obtaining the protection of the Act, to obtain the certificate of an actuary approving of its tables. The effect of this was to reduce the number of Societies taking the protection afforded by the legislature to less than one-half of what it had previously been.

By the Act passed in 1850, and now in operation, *no* Friendly Society is *compelled* to obtain the certificate of an actuary to its tables, unless they are for an immediate or deferred certain annuity.

The foregoing extracts from tables, &c. would induce the belief that we are almost as far removed from the desired point as in 1819; not, indeed, from the want of men of talent and mathematical skill, but from the fact that there has not been hitherto sufficient data on which to form their calculations with precision.

Before proceeding, we must repeat that "*profit*" is no element in a Friendly Society. If the contributions are too high they are not fair, and if too low they are not safe.

With this assumption we proceed to review the foregoing extracts, and consider that with the present amount of information relating to the "*mortality*" occurring among the working classes, there is much yet to be desired. Where the facts at present collected are similar in their results, they require further corroboration; and in some ages they are all different.

With regard to "sickness," it is doubtful whether a table of contributions and allowances (if beyond the age of 50) can be constructed, for want of sufficient data, with that exactness which ought to exist between receipts and payments, without having recourse to the skill of the mathematician in approximating the result. It must, however, be admitted that where the interests of the whole of the working classes are concerned, a more extended collection of facts would form a preferable source from whence to deduce the laws regulating sickness.

The fact of the imperfection of the existing data is well known by many secretaries and others connected with Friendly Societies. It is also admitted by most actuaries, as is exemplified in the adoption of the following rule, or a similar one, in most Societies where the tables are certified by actuaries, and generally at the suggestion of the certifying actuary:—

"For the better security of the Society, once in every 5 years at least the Committee shall cause to be made by the Society's consulting actuary, or some other competent actuary, a valuation of the assets and liabilities, and the same shall report thereon; and if at any time the assets shall be found insufficient to meet the expected liabilities, then the Committee shall have power either to increase the contributions of the members, or to reduce the benefits promised, according as they shall think best; but if, on the other hand, the assets shall at any time exceed the expected liabilities, then in such case the Committee shall have power to apply such surplus either to the increase of the benefits promised, or to the reduction of the members' contribution, and in such proportion as shall appear in the opinion of an actuary safe and desirable."

The foregoing rule was extracted from the rules of a Society, the tables of which were certified in May, 1852, to be "*fair* and *safe*, and *without prejudice to any*."

From the preceding remarks, it is presumed that the assertion that the law of sickness as affecting particular sections of the community and particular localities is still very imperfectly known, requires no proof. Only two out of the four collections of data enter into the question.

Such being the imperfect state of information relating to mortality and sickness among the working classes, it may be inquired why no use has been made of the quinquennial returns of sickness and mortality from Friendly Societies which have been made since 1829? The answer is, that no general desire to have them used has been expressed, and consequently no public grant has been expended for the purpose, and the form of return was deficient in some material subjects. In the present "form," however, the defects have been amended, and the Registrar is in official possession of between thirty and forty large volumes of them, containing a collection of facts exceeding any ever before made. These, if tabulated, would, it is thought, go far to illustrate the sickness and mortality of the working classes.

It is to be desired that the "Returns" should be placed before the Institute of Actuaries, in order that the Institute may be enabled to propose a scheme or plan of proceeding for tabulating them, to be carried out under the direction of the Registrar of

Friendly Societies in England for the public benefit, so that an approach may be made to the true statistics of the question.

From data so prepared tables might be calculated at one rate of interest for all ages of life, and for all circumstances. When the next quinquennial return is due, the preceding data could be compared with it, and readjusted where necessary. This appears to be the proper use to which all such future returns should be applied.

An Abstract of the Friendly Societies' Returns is now preparing for publication, which, when complete, will give an idea of the quantity of facts collected, and of the great number of the population interested in the settlement of the question as to what constitutes the true law of sickness, through all the years and circumstances of life, among the working classes.

When another Report similar to that on which the English Life Table is founded shall have been made, and when the results of the present Return of Sickness and Mortality from Friendly Societies shall also have been compared with, and readjusted by, a subsequent Return, the subjects of mortality and sickness in Friendly Societies will cease to be of that speculative character which they have hitherto been.

In conclusion, it may be remarked that this Paper (among others) shows the necessity for the existence of such a body as the Institute of Actuaries, where the intellect and skill of the profession can be brought to a focus. If the members assist to practically elucidate the laws of sickness and mortality as existing among the working classes, which have remained in strange obscurity till the latter part of the nineteenth century, they will fully have justified their association.

NOTE.—We are quite justified, we believe, in stating that the Council of the Institute by no means acquiesce in all the opinions or in the entire accuracy of all the statements contained in this Paper. The knowledge which the author has acquired of the subject discussed is no doubt highly creditable to him; but it is one which cannot be mastered but at the expense of a long and laborious apprenticeship. The notion that there is a "fixed" rate of mortality and a "fixed" rate of sickness is evidently untenable. There is reason to believe that these rates differ in every association, not widely perhaps, but characteristically. Independently of the locality of a society and occupa-

tion of the individuals forming one, the mode of admitting members, and the grounds of exclusion—the quantum of medical investigation—the rules by which persons are admitted on the sick list or taken from it—the position and character of the members who have the management—and many other similar influences, make themselves felt, and give a particular character to each. Even the average rates of sickness and mortality throughout the country cannot be considered as ever "fixed." No doubt they may remain invariable for years; but time may still produce changes, as we have reason to believe it has done already. Such being the case, there is, of course, great room for difference of opinion as to the rates which should be selected in any particular instance; and it is quite possible that good reasons might be found for the discrepancies which Mr. Tompkins points out, and that dissimilarities exist, either in the circumstances or the constitution of these Societies, which would naturally escape the observation of all but that of an experienced actuary. It is, however, undoubtedly true, that great inconvenience is felt from the want of sufficient data, especially as regards sickness—what has been collected and published on that head being, as Mr. Tompkins justly states, notoriously imperfect and insufficient; and therefore it is undeniable that the making the valuable data collected with so much labour by Mr. Tidd Pratt accessible, would be a great boon to the whole community. As regards the general question, it is high time that some step were taken to place the Friendly Societies of this country on a better footing; for, notwithstanding the laudable efforts made by the Government for years past, and the strenuous exertions of Mr. Sotheron, Mr. Bonham-Carter, and other members of the legislature, to bring about such changes in the law as might be calculated to improve their condition, nothing can on the whole be more unsatisfactory. For our own part we are disposed to think that it would be wiser to discourage them, and to strive to induce the classes more immediately concerned with them to follow the example of their perhaps more intelligent fellows in the next and superior grades of life, who prefer to resort for similar objects to independent associations, established for the purpose of meeting their wants in this respect. It is much to be feared that the good effected by the Friendly Societies bears no proportion to the loss and disappointment which their failure so frequently entails; and it is to be doubted whether there can ever be that constancy and stability in the management of them which is essential to carry out and bring to completion contracts which, from their nature, must be of

many years' duration. If associations of the kind be indispensable to the classes from which Friendly Societies are constituted, it would be well to base them on the most simple principles, leaving more serious arrangements to be dealt with by more stable bodies. An annual subscription, to be expended upon the sickness of the year, or to be divided amongst the survivors at the end of it, might be to a certain extent beneficial, and might serve for the cultivation of a friendly understanding, and for the promotion of mutual good offices; whilst any loss of moment, or disappointment of consequence, would be out of the question. All experience seems to prove that a high order of intelligence, and integrity strengthened by a somewhat conspicuous position, are alone fitted to administer successfully affairs of the kind in question; and that the interests of the labouring population would be more secure and better cared for in the hands of the Savings' Banks and well established Assurance Companies than in their own.—Ed. *A. M.*

On the Influence of the Ages of the Parents at the time of Marriage on the Sex of Children, and on the Prolificness of Marriages. By Samuel Brown, F.S.S., *one of the Honorary Secretaries of the Institute of Actuaries, and Actuary of the Mutual Life Assurance Society.*

In the course of the inquiries which led to the paper, read before the Institute of Actuaries, and published in the last number of the *Assurance Magazine*, on "the Uniform Action of the Human Will," which was principally illustrated by the regularity in the proportion of marriages between different classes and at different ages, I was very much struck by the law which appears to regulate the relative proportion of the sexes at birth. It has long been observed that, in all countries in which the law of population is not unusually disturbed, more males are born than females. This is the result, not of a few isolated observations, but of more than seventy millions of facts, collected from authentic sources in different kingdoms, and for many succeeding years. The proportion varies from nearly 109 males to 100 females in Russia, down to 104·62 males to 100 females in Sweden; Great Britain occupying the last place but one, about 104·75 to 100. The average births for all Europe may be taken as 106 males to 100 females. The

reflection requires not to be forced upon us, that this is one of those wise and beneficent provisions of Providence, by which, in after years, the relative proportion of the sexes, so essential to the preservation and increase of a population, is maintained. The life of man is exposed to many more destructive influences than that of woman. Even before birth it appears as if males were less capable of coming to maturity. MM. Quetelet and Casper remark, that in Flanders and in Berlin the proportion of still-born males to females was, in both sets of observations, as 14 to 10. In infancy the perils of life to males are greater. In England, only 674 males out of 1000 reach the age of fifteen years, when 700 females survive to that age. In later years man suffers from the unhealthy occupations in which he may be engaged, from the toils and anxieties of business, from the risks of foreign climate, and the dangers of war. If all these circumstances were acting on the male sex only, in a population in which males and females were born in equal numbers, it is evident that the balance of the sexes would be destroyed. The law of nature which provides for the continuance and increase of a population by marriage would be checked, and the population would necessarily decrease, because in each generation there would be a greater disparity in the number of each sex, and consequently a smaller number of marriages. The greater number of the male births tends to restore the necessary equality of sexes, and provides for the continuance of the species. In four enumerations of the population of Sweden, given in the Registrar-General's Sixth Report, the males and females between the ages of 10 and 15 were—

Year.	Males.	Females.	Difference in excess.
1805	121,946	120,767	1,179 Males.
1810	120,157	120,295	138 Females.
1820	130,351	131,518	1,167 Females.
1830	170,878	169,870	1,008 Males.
	543,332	542,450	882 Males.

so that on the average of these four different periods there was a difference of the sexes of only 16 in 10,000 males.

In 1835, in the towns of Norway there were existing, between the ages of 10 and 20, 12,799 males and 12,439 females; and in all the country, 123,823 males to 120,299 females, the dispropor-

tion in numbers previous to these ages being in favour of the males, and afterwards on the side of the females. If the ages 10 to 15 only be taken, they would appear to be very nearly alike. Several other instances might be quoted, but these will suffice to prove the fact of a near approach to equality of the sexes about the age of puberty.

M. Hofacker appears to have been the first to draw any general conclusions from the researches which he made into the influence of the age of parents on male and female births, and, in a paper published in the *Annales d'Hygiène* for 1829, stated the result of his inquiries to be that, when the mother was older than or of equal age with the father, more girls were born than boys; but the greater the difference of age on the side of the father, the more the number of male children predominated. The following table is the summary from which these deductions are drawn. M. Quetelet, however, suggests that he has not been sufficiently precise as to the source or authenticity of his data.

TABLE I.—*Showing, by M. Hofacker's observations, the proportion of Male to Female Births when the husband is older or younger than his wife.*

Age of the Husband.	Age of the Wife.	Proportion of Males to 100 Female births.
Younger than his wife	.. ..	90·6
Same age	.. ..	90
Older by 3 to 6 years	.. ..	103·4
" 6 to 9 "	.. ..	124·7
" 9 to 18 "	.. ..	143·7
" 18 and upwards	.. ..	200
24 to 36 years	16 to 26	116·6
"	36 to 46	95·4
36 to 48 "	Young	176·9
"	Middle aged	114·3
"	Older	109·2
48 to 60 "	Middle aged	190
"	Older	164·3

But Mr. Sadler, in his *Law of Population*, published in 1830, pursuing the same subject, has been at considerable pains to collect such original data as bore upon it, and with great labour compiled a set of tables, by which much curious information is elicited. It must be borne in mind that his work is written avowedly to expose the errors of Malthus; and he attacks with great bitterness and energy what is called the "preventive check" system. The anti-populationists maintain that early marriages are most conducive to human prolificness;

and, believing that such increase may be much beyond the rate of increase in the production of food, they discourage such unions, as tending to poverty and misery. Sadler, on the other hand, maintains that later marriages are more fruitful in proportion to the time they are deferred, and that the attempt, therefore, to oppose the order of nature, is met by a counteracting law, which restores the average prolificness of marriages, and maintains the rate of increase of the population. If the "preventive check" defers the average period at which marriages take place, the period of female prolificness is lengthened in proportion; and still further, as a succession of early marriages would bring generations closer together, and thus lead to a too rapid increase of population, the evil is corrected by another law of nature, which renders early marriages not only less fruitful than later ones, but provides that the children of such marriages should die at early ages in greater proportions than children born of later marriages. The former, therefore, though more productive, do not permanently add to the population more than the latter. Admitting his facts, and all these conclusions to be deduced correctly from them, it does not appear to me that the argument is strong against the opponent system, but rather the contrary. The whole object of the Malthusian system seems to be, that men should not marry till they had, either in possession or prospect, some means of maintaining an increasing family, not rendering them a burden to the community, but making them what an increase of population in olden times was always considered to be—the strength and blessing of a country. If later marriages on the part of both parents would have this effect, and do not, as Mr. Sadler contends they do not, diminish the ratio of increase, his reasonings bear surely as much in favour of the "preventive check" as against it.

In very remote periods we find, as in many of our social questions of the day, evidence that the discoveries which we think new were known to the ancients, though we have no record of the facts from which their conclusions were drawn. Aristotle considered early marriages injurious to the procreation of children, and dangerous to the mother. "Many," he says, "suffer greatly, and many die in childbirth." Lycurgus, though he strove to promote marriages and to render celibacy disgraceful, yet provided that women should not marry till they had attained the full vigour of their age.

To prove that the fecundity of marriage increases as the period of union is postponed, the following interesting table may be

quoted from Sadler, as calculated from data furnished by Dr. Granville regarding 876 cases of parturition which he attended as Physician to the Benevolent Lying-in Institution and the Westminster Dispensary. In the second column is shown the number of births which occurred on an average to each year of marriage, according to the age of the mother when contracted; and the last column shows the proportion of mortality amongst these births to the date of the existing pregnancy.

TABLE II.—*Showing, from Dr. Granville's cases, the proportion of Births for each Year of Marriage, according to the Age of the Mother, and the proportion of Mortality to each Birth.*

Age when Married.	Average Number of Births for each Year of Marriage.	Effect on the Mortality of Children.			Children to each Marriage.
		Number of Marriages.	Number of Living Births.	Proportion of Mortality to each Birth.	
13 to 16	·457	74	376	·444	5·08
16 „ 20	·504	354	1,307	·425	3·70
21 „ 24	·520	283	823	·424	2·91
25 „ 28	·545	110	287	·407	2·61
29 „ 32	·590	38	67	·313	2·03
33 „ 36	·777				
37 „ 39	1·125				

The last column has been computed by M. Quetelet, and shows that though the annual fecundity is less, the fruitful wives who were married early have produced the most children.

It must be remarked, that the mortality of children appears to be taken to the date of observation; and as a greater number of years would have elapsed from the earliest marriages than from the later ones, these observations are not sufficiently conclusive for any general law.

In connection with this subject, and for the same class of results, a very interesting and elaborate Report may be referred to (in the eleventh volume of the *Journal of the Statistical Society*, page 193), of "An Investigation into the State of the Poorer Classes of St. George's-in-the-East, in the early part of 1845." In 1488 cases the ages of the fathers and mothers are given at the date of their first child; and if we may suppose the marriages to have taken place one year earlier, the percentages may be compared with the Table for all England, given in my last paper.

TABLE III.—*Showing the proportion of Marriages, at different Ages, of the Poorer Classes in St. George's-in-the-East.*

Age of Marriage.	Proportion per cent.		Proportion per cent., England.	
	Males.	Females.	Males.	Females.
Under 20	11·43	30·98	2·35	11·45
20 to 30	73·59	64·45	89·96	83·38
30 „ 40	12·90	4·30		
40 & upwds	2·08	·27	7·69	5·17
	100·	100·	100·	100·

We shall be considering, therefore, cases of remarkably early marriages when compared with the general average of England.

TABLE IV.—*Showing the average Number of Children and the average Mortality per cent. of Births to each Marriage.*

Years elapsed since Birth of First Child.	Marriages formed at Ages of Mother.								Total Ages, 14 to 43.	
	16 to 20.		21 to 25.		26 to 30.		31 to 35.			
	Born.	Mort. per cent.	Born.	Mort. per cent.	Born.	Mort. per cent.	Born.	Mort. per cent.	Born.	Mort. per cent.
10	5·05	36·87	4·51	37·09	4·42	37·89	3·44	35·48	4·62	37·18
20	7·68	47·44	7·01	43·10	6·43	44·36	3·00	16·67	6·87	44·16
30	8·41	53·03	7·89	43·89	6·80	48·53	7·00	64·29	7·86	48·11
40	10·85	63·12	8·24	57·14	5·00	68·	4·00	50·	8·17	61·19
50	12·80	75·01	5·00	70·	3·50	28·57	..	..	9·00	70·37
60	14·90	71·43	..	..	..	..	..	..	14·00	71·43
Total average	6·07	46·11	5·15	41·07	4·87	39·61	3·94	37·56	5·33	42·54

It may be noticed that though the mortality per cent. agrees in some degree with Dr. Granville's statement, yet the general average of these results is contrary to those deduced by Mr. Sadler from the peerage of England, it appearing that the earlier the age of marriage the greater the number of children born to each marriage. The effect of mortality on the children of these marriages will be found in the second parallel column under each age. The children born of marriages in which the mothers at that date were 21 to 25 years of age, are subject to a less rate of mortality than at ages either immediately preceding or following. At age 31 and upwards, the facts are too few to admit of any accurate deduction. An important point of the inquiry is as to the actual increase of population arising from this ratio of deaths to births at different intervals, and it appears from this table that marriages formed under 25 years of age increase the population more than

those formed above that age. The rate of increase is somewhat higher at the younger ages, but not sufficiently so to affect the results materially. The number of families is 1506; the number of births, 8034; of which 4616 children, or 57·46 per cent., are still alive. The principal defect of these observations is that unfruitful marriages are not included in these 1506 families, nor the marriages in which, though fruitful, both of the parents had died before the lapse of years brought under review. It must also be remarked, that as so large a proportion of children still survive, the result might at later dates be very different as to the ratio of mortality noticed. Lastly, they are classified only according to the age of the mother at the birth of her first child. They can scarcely, therefore, disturb the results of Mr. Sadler's more complete tables, to which we now turn.

The following may be briefly stated as the general conclusions arrived at:—

That the proportion in which the sexes are born is governed and regulated by the difference in the ages of the parents in such manner, that on the average, among the total of the births, the sex of that parent shall exceed in number in proportion as the age exceeds; and still further, that that excess shall correspond to the mortality which would take place in a period equal in duration to the interval between the ages of the parents; preserving therefore the balance of the sexes at the usual age at which they marry.

The principal data to which Mr. Sadler appeals for his various conclusions are derived from a careful analysis of the peerage of England; and to prove that the number of children does not depend upon the ages of the parents taken separately, the following table is given:—

TABLE V.—*Showing the proportion of Males born to Females in the Marriages of* 1027 *Peers and* 471 *Peeresses, being the total Number whose Ages could be ascertained at the date of Marriage.*

Ages.	Peers.		Peeresses.	
	Number of Marriages.	Proportion of Male to 1,000 Female Births.	Number of Marriages.	Proportion of Male to 1,000 Female Births.
Under 16	54	1,153	13	1,121
16 to 21			177	1,299
21 „ 26	307	938	191	1,055
26 „ 31	284	1,143	60	1,250
31 „ 36	137	1,133	21	1,110
36 „ 41	90	987	9	1,000
41 „ 46	58	1,120	..	..
46 „ 51	51	952	..	..
51 „ 56	19	1,363	..	..
56 „ 61	11	2,000	..	..
61 „ 66	12	750	..	..
66 & upwds	4	500	..	..
	1,027	1,052	471	1,166

The irregularities in the table which prevail at different ages, to as late a period as the observations extend, prove that no law of the proportion of the sexes at birth can be traced by depending merely on the ages of the parents separately. If, however, 381 instances can be considered sufficient, the following table, drawn from that number of marriages in which the ages of both the peers and peeresses were recorded, will show that in proportion as the husband exceeded the wife in age, the number of male children was greater; and in proportion as the wife exceeded the husband in age, the number of female children was greater.

TABLE VI.—*Showing, in* 381 *First Marriages of Peers or Peeresses, the number of Male or Female Children born in proportion to the Difference of the Ages of the Parents at the time of Marriage.*

Difference of Age; the Husband being	No. of Marriages.	Male Births to 1000 Female.	Female Births to 1000 Male.
Younger.....	54	865	1,156
Same age	18	947	1,055
Older, 1 to 6 years..	126	1,037	964
„ 6 to 11 „ ..	107	1,287	789
„ 11 to 16 „ ..	43	1,475	678
„ 16 to 21 „ ..	22	1,600	625
„ 21 and upwards	11	1,667	600

The Author draws attention to the fact, exhibited in the above table, that "where the difference of age is from 1 to 6 years, the sexes may be justly regarded as being, in a natural point of view, cotemporary, and we there find the proportion of males and females born (1000 to 964) as that which seems to anticipate the excess of mortality in the former sex up to the nubile age so accurately, as to produce that balance of their numbers which, as before observed, is found to exist at that period. To preserve that balance, so essential to the preservation of the population, when the males habitually postpone marriage, it will be seen that the proportion of male births increases with the term of that postponement, and conformably to the law of mortality."

Mr. Sadler then gives a comparison of the diminution in the ratio of female births as compared with male, and shows that in the total it is almost exactly equivalent to the diminution in every five years in the proportion of males existing, by his Table of the Population of England in 1821, to a total population of 20,000 of both sexes. From his having taken the percentages on the diminishing numbers his table is not very clear, and I have therefore calculated the following comparison from the same data:—

TABLE VII.—*Showing that the Increase in the ratio of Male to Female Births, as the Age of the Husband exceeds that of the Wife, is equal to the Decrease in the existing Male population.*

Difference in Age. The Husband older by	Diminution in the ratio of Female Births every 5 years.	Husband's assumed Age on an average of 5 years.	Proportion of existing Males every 5 years.	Increase in the ratio of Male to Female Births.	Decrease in Male lives.
1 to 6 years	1,000	21	1,000	..	..
6 to 11 „	819	26	806	181	194
11 to 16 „	703	31	725	297	275
16 to 21 „	648	36	665	352	335
21 and upwards	622	41	604	378	396
Average..	698	..	700	302	300

Assuming that the number of facts were sufficient for the average, and that no selection or arrangement of them was made to prove a foregone conclusion, this table exhibits a remarkable instance of the regularity with which the laws which govern our social existence are found to work. The increase in the number of males born is on the average represented as exactly equal to their diminished proportion to the other sex, which would result from

males deferring their average age of marrying to a later period of life, the average age of females at marriage being supposed to remain unaltered. Such important inquiries ought not, however, to rest on the few facts which have yet been collected. In the office of the Registrar-General of Births, Deaths, and Marriages much information no doubt exists, which it is to be hoped will be made public in some of his future able Reports, which we may justly call them if they resemble the past. The indefatigable industry and talents of Mr. Farr have already opened up to us in previous reports many novel subjects of the highest importance to society, and we may expect that the Report of the last Census, when it appears, will throw much additional light on the theory of population, and the circumstances which affect it.

Several other questions arise out of the series of tables we have considered, but they must be reserved for future discussion. The preceding Table VII. was constructed on the results of first marriages only. It is a remarkable fact, confirmed, as Mr. Sadler says, by all the observations he has been able to consult, that second and subsequent marriages invariably produce more females than males. The number of second and subsequent marriages in the Register of the Peerage, so often quoted, and in which the ages of both sexes could be ascertained, was 54, the male births being 117, the female 129. In 107 instances, in which the ages of either the father or the mother were known, he found that from the age of the widower being 22 to 27, at intervals of five years, up to the age of 67, the proportion of male to 1000 female births diminished from 913 to 750, the average being 797.

Another remarkable fact has been noticed, that in illegitimate connections the female births in every country are found to be in larger proportion to the male births than amongst children born in wedlock. Amongst other observations on this subject, may be quoted a table from Moser, whose admirable work, *Die Gesetze der Lebensdauer*, ought, like Quetelet's works, to be better known in England.

TABLE VIII.—*Showing the proportion of Male to* 1000 *Female Births, Legitimate and Illegitimate.*

	Legitimate.	Illegitimate.		Legitimate.	Illegitimate.
Prussia, 1820-34 ..	1,060	1,031	East Prussia & Posen	1,058	1,036
France.....	1,067	1,048	Paris	1,038	1,034
Naples, 1819-24....	1,045	1,037	Geneva, 1814-33 ..	1,090	1,015
Austria	1,062	1,043	Amsterdam.....	1,050	1,088
Wirtemburg	1,060	1,035	Leipzig	1,062	1,059
Sweden	1,047	1,031	Montpellier, 1772-92	1,071	1,008
Bohemia	1,057	1,004	Frankfort-on-Maine	1,028	1,078
Westphalia, 1809-11	1,047	1,004			

Mr. Sadler, in accordance with the theory deduced from his observations, naturally explains this fact by considering that, as such connections take place at earlier ages than lawful unions, the males are more nearly of the same age with the females; which is somewhat confirmed by M. Quetelet's conclusions, that the maximum of marriages does not occur till after men have passed what he calls the age of violent passions. But M. Bernoulli, in a short but able article in the *Annales d'Hygiène* for 1838, argues that the conceptions may be in the same proportion of the sexes, whether the parents are married or not; but that from the anxiety of the mother to hide her shame, the means to ensure premature delivery are frequently resorted to, and that from the known liability of male children to perish rather than females, a fewer number survive in such cases; and further, that the mother, being more desirous that her male offspring should not be considered illegitimate than her female, would be very likely to conceal the fact either by not inscribing its name on the register, or by causing it to pass as the fruit of a marriage, or by persuading the father to contract a marriage with her. If even 2 women out of 100 succeed in any of these objects with regard to the male offspring, the number of male to female births would be reduced from 105 to 103 males in proportion to 100 females.

In all future inquiries, it is evident that the mean duration of marriage, or the joint existence of a male and female life, as given by Mr. Farr—or rather, I should say, the term of this joint duration which ends with the average age at which females cease to be child-bearing—must be a principal element in the calculation. The average period of child-bearing is not more than 30 years, and may, for the sake of limiting the term of inquiry, from the date of marriage, be taken to terminate with age 45 on the side of

the female. On the side of the male the period may extend for 20 years longer, which accounts for the fact of there being more second marriages of males than of females.

It is a wise provision of nature, that in countries where the period of female prolificness commences at an early age it terminates much earlier in proportion, or the constitution of the mother might be exhausted, and the children of later life be born only to die of debility and disease.

Of all these speculations, by far the most important is that of Mr. Sadler. The law which he deduces from the facts recorded is at once simple, and in accordance with all the operations of nature. It is evident that if marriages are deferred to a much later period of life on the part of the male than that at which the number living of the sexes are equally proportioned, that a large number of the male population must have died in the interval; and, consequently, in a country in which polygamy on the part of either sex does not prevail, many females would be left unmarried. If the children from these marriages were born in equal proportion of the sexes, and the same law of marriage continued to prevail, a still smaller proportion of marriages would take place in the second generation, and by degrees the whole population would become extinct. The same result would take place if the female population married much later than the period at which the sexes are equal. But the proportion of male or female births, exceeding as the male or female exceeds in age, does in a manner almost unnoticed restore the equality of the sexes, and preserves the race from extinction. Of course, the same result would be arrived at by the proportion of the sexes being made equal at any other age than is now generally found to be the case in all countries; but such a change would involve a total alteration in the constitution of man, and the period when the sexes relatively arrive at maturity; and the working of natural laws in unusual circumstances is generally found to be such as brings about the needful results with the least violence to their usual operation. If the law deduced from the few observations hitherto recorded be confirmed on more extensive inquiries, it will be an additional proof that all the actions and qualities of man, physical as well as mental and moral, are, unconsciously to him, subservient to general laws, which adapt themselves to act to the same great end, in spite of all opposition and all the changes or caprice of society, and tend to preserve, as well as to regulate, his social existence.

Mortality amongst Selected Lives in Germany.

THE extension of the relations of the Assurance Companies of Great Britain with those of foreign countries, makes it appear desirable to bring forward such observations and tables as we can collect, which have any recognized value or authority abroad. The table which we now present to our readers has obtained considerable repute in Germany, and is used as the foundation both of annuity and assurance values. It is referred to by Masius in his *Lehre der Versicherung*, published in 1846, and given at length in his very useful periodical on assurance subjects, entitled *Allgemeine Versicherungs-Zeitung*, for 1847. The table was prepared by Herr Rechnungsrath Brune, in Berlin, and first published by him in 1837. Even at that time the observations embraced a long period, being carried over 58 years (from 1776 to 1834), and a large mass of facts, comprising no less than 31,500 marriages. The data so collected throw a considerable light on the duration of German life. They represent what is equivalent to the selected lives of Assurance Companies in this country, for the male lives were required to undergo a strict examination as to their state of health. They are the first German tables which can be considered to lay claim to close accuracy in the facts observed, and the Brunswick Annuity Company have chosen them, with some slight alterations, for the basis of their Tables of Rates. The most suitable tables with which to compare them will evidently be the Tables of the Experience of the Equitable Society, and Finlaison's Government Annuity Tables; and we append here a short table, showing the mean duration of life by these observations respectively.

Age.	Brune's Table.		Finlaison's Government Annuities.		Equitable experience.
	Male.	Female.	Male.	Female.	Male.
21	39·5	38·6	37·8	43·4	41·0
30	32·7	33·6	33·2	37·6	34·5
40	25·4	27·2	27·0	31·1	27·4
50	18·6	20·2	20·3	24·4	20·4
60	12·4	13·6	14·4	17·3	13·9
70	7·6	8·2	9·2	11·0	8·7
80	4·3	4·9	4·9	6·5	4·8
90	1·4	2·8	1·9	2·8	2·5

It will be observed that the male lives by Brune's tables show a considerable difference less in the mean duration of life when compared with the English tables, and the female lives a still greater difference at all ages.

In the publication, in the latter work of Herr Masius, to which we have referred, the former observations, both of male and female lives, are brought down by Herr Brune to 1845, being a further period of 11 years.

I. *Table of Mortality (Male Lives) according to the Experience of the Prussian Widows' Annuity Society for* 69 *Years, from* 1776 *to* 1845.

Age.	Living at the beginning of the year.	In the course of the year.		Table of Mortality deduced therefrom.			
		With-drawn.	Died.	Living.	Died.	Probability of dying in a year.	Expectation of Life.
21	39	..	1	9,260	58	·00626	39·50
22	115	2	1	9,202	58	·00630	38·75
23	294	3	4	9,144	59	·00645	38·00
24	696	16	7	9,085	60	·00660	37·14
25	1,498	27	4	9,025	61	·00676	36·49
26	2,674	45	21	8,964	61	·00680	35·73
27	4,340	67	27	8,903	61	·00685	34·97
28	6,246	109	31	8,842	62	·00701	34·21
29	8,398	125	81	8,780	63	·00717	33·45
30	10,561	180	67	8,717	64	·00735	32·69
31	12,657	180	81	8,653	66	·00763	31·93
32	14,674	213	134	8,587	69	·00803	31·17
33	16,451	244	140	8,518	73	·00857	30·42
34	17,958	257	167	8,445	76	·00900	29·68
35	19,198	293	175	8,369	78	·00932	28·94
36	20,106	283	188	8,291	81	·00977	28·21
37	20,790	326	226	8,210	85	·01035	27·48
38	21,246	304	226	8,125	89	·01095	26·76
39	21,548	329	241	8,036	93	·01157	26·05
40	21,734	317	271	7,943	96	·01209	25·35
41	21,737	280	245	7,847	98	·01249	24·65
42	21,631	312	261	7,749	100	·01290	23·96
43	21,355	316	304	7,649	103	·01347	23·27
44	20,838	257	316	7,546	106	·01405	22·58
45	20,374	288	300	7,440	110	·01478	21·89
46	19,809	260	312	7,330	114	·01555	21·21
47	19,086	244	335	7,216	119	·01649	20·54
48	18,335	267	307	7,097	124	·01747	19·88
49	17,454	236	315	6,973	128	·01836	19·22
50	16,544	229	309	6,845	131	·01914	18·57
51	15,676	230	277	6,714	135	·02011	17·92
52	14,763	196	319	6,579	139	·02113	17·28
53	13,782	199	305	6,440	144	·02237	16·64
54	12,820	177	316	6,296	149	·02366	16·01
55	11,945	191	311	6,147	155	·02521	15·39
56	11,038	183	304	5,992	162	·02703	14·77
57	10,151	162	299	5,830	168	·02882	14·17
58	9,285	166	274	5,662	175	·03091	13·58
59	8,505	140	299	5,487	183	·03336	13·00
60	7,713	121	261	5,304	192	·03621	12·43
61	7,024	112	285	5,112	202	·03942	11·87
62	6,353	142	260	4,910	211	·04297	11·34
63	5,709	122	267	4,699	218	·04638	10·83
64	5,098	117	260	4,481	223	·04978	10·33
65	4,524	92	232	4,258	226	·05308	9·85
66	4,016	102	233	4,032	228	·05656	9·37
67	3,517	87	245	3,804	231	·06072	8·90
68	3,039	91	201	3,573	235	·06579	8·44

Age.	Living at the beginning of the year.	In the course of the year.		Table of Mortality deduced therefrom.			
		With-drawn.	Died.	Living.	Died.	Probability of dying in a year.	Expectation of Life.
69	2,640	80	163	3,338	238	·07128	8·00
70	2,288	78	170	3,100	241	·07776	7·58
71	1,944	70	187	2,859	242	·08467	7·17
72	1,625	62	161	2,617	243	·09320	6·79
73	1,343	48	145	2,374	242	·10194	6·44
74	1,100	46	120	2,132	237	·11111	6·11
75	877	41	82	1,895	228	·12034	5·81
76	711	41	88	1,667	210	·12594	5·54
77	563	29	61	1,457	188	·12903	5·26
78	450	21	48	1,269	166	·13089	4·97
79	358	20	60	1,103	149	·13514	4·64
80	265	21	39	954	137	·14368	4·29
81	195	12	33	817	128	·15674	3·93
82	145	4	37	689	121	·17575	3·57
83	100	5	21	568	114	·20080	3·22
84	70	9	11	454	104	·22936	2·90
85	49	7	10	350	89	·25445	2·62
86	31	2	10	261	74	·28329	2·34
87	19	1	5	187	60	·32051	2·07
88	12	..	2	127	47	·37037	1·81
89	8	1	2	80	34	·42553	1·58
90	4	1	..	46	22	·47847	1·37
91	3	1	1	24	13	·54054	1·16
92	1	..	..	11	7	·63694	·95
93	1	..	..	4	3	·75000	·75
94	..	..	..	1	1	1·00000	·50

II. *Table of Mortality (Female Lives) according to the Experience of the Prussian Widows' Annuity Society for* 69 *Years, from* 1776 *to* 1845.

Age.	Living at the beginning of the year.	In the course of the year.		Table of Mortality deduced therefrom.			
		With-drawn.	Died.	Living.	Died.	Probability of dying in a year.	Expectation of Life.
16	121	..	1	10,000	162	·01620	40·56
17	430	4	9	9,838	156	·01586	40·22
18	1,139	13	20	9,682	149	·01539	39·86
19	2,411	9	37	9,533	141	·01476	39·47
20	4,061	11	57	9,392	132	·01405	39·06
21	6,074	25	82	9,260	124	·01339	38·61
22	8,266	40	96	9,136	117	·01281	38·12
23	10,503	43	129	9,019	111	·01231	37·61
24	12,792	46	162	8,908	106	·01190	37·08
25	14,901	67	177	8,802	102	·01159	36·52
26	16,913	70	218	8,700	100	·01149	35·94
27	18,584	52	199	8,600	99	·01151	35·35
28	20,090	64	228	8,501	99	·01165	34·76
29	21,299	76	253	8,402	98	·01166	34·16
30	22,245	77	247	8,304	97	·01168	33·56
31	22,956	66	277	8,207	97	·01182	32·95
32	23,411	69	259	8,110	96	·01184	32·34
33	23,803	65	295	8,014	96	·01198	31·72
34	23,919	65	280	7,918	95	·01200	31·10
35	23,926	54	296	7,823	94	·01202	30·47
36	23,817	51	284	7,729	93	·01203	29·83
37	23,577	64	304	7,636	93	·01218	29·19

Age.	Living at the beginning of the year.	In the course of the year.		Table of Mortality deduced therefrom.			
		With-drawn.	Died.	Living.	Died.	Probability of dying in a year.	Expectation of Life.
38	23,191	47	301	7,543	92	·01220	28·54
39	22,757	48	259	7,451	90	.01208	27·89
40	22,167	36	251	7,361	88	·01195	27·22
41	21,422	49	266	7,273	86	·01182	26·55
42	20,586	44	237	7,187	85	·01183	25·86
43	19,609	41	211	7,102	84	·01183	25·16
44	18,673	40	217	7,018	84	·01197	24·46
45	17,706	33	237	6,934	85	·01226	23·75
46	16,744	19	231	6,849	87	·01270	23·03
47	15,795	22	199	6,762	88	·01301	22·32
48	14,925	28	213	6,674	90	·01348	21·61
49	13,961	20	162	6,584	92	·01397	20·90
50	13,252	8	205	6,492	95	·01463	20·19
51	12,547	18	168	6,397	98	·01534	19·48
52	11,879	10	225	6,299	102	·01619	18·78
53	11,106	23	195	6,197	107	·01727	18·08
54	10,416	8	195	6,090	114	·01872	17·39
55	9,794	3	191	5,976	123	·02058	16·71
56	9,229	12	208	5,853	131	·02238	16·05
57	8,617	6	205	5,722	139	·02429	15·41
58	8,034	8	221	5,583	146	·02615	14·78
59	7,505	6	210	5,437	151	·02777	14·16
60	6,989	2	197	5,286	156	·02952	13·55
61	6,516	3	210	5,130	161	·03139	12·95
62	6,046	2	220	4,969	167	·03361	12·35
63	5,578	2	195	4,802	175	·03644	11·76
64	5,155	2	206	4,627	185	·03998	11·19
65	4,725	2	198	4,442	196	·04413	10·64
66	4,358	3	216	4,246	208	·04900	10·10
67	3,956	3	224	4,038	219	·05423	9·60
68	3,573	1	211	3,819	228	·05970	9·12
69	3,212	3	194	3,591	235	·06545	8·67
70	2,890	2	214	3,356	239	·07123	8·24
71	2,540	..	196	3,117	240	·07698	7·83
72	2,252	..	193	2,877	240	·08340	7·45
73	1,950	..	177	2,637	239	·09066	7·08
74	1,696	..	162	2,398	235	·09804	6·73
75	1,456	1	153	2,163	228	·10537	6·41
76	1,238	1	150	1,935	217	·11223	6·11
77	1,024	..	120	1,718	202	·11765	5·82
78	853	..	103	1,516	186	·12270	5·52
79	692	..	93	1,330	171	·12853	5·22
80	569	..	71	1,159	159	·13717	4·92
81	462	..	73	1,000	151	·15100	4·63
82	366	..	68	849	143	·16835	4·36
83	273	..	50	706	131	·18553	4·14
84	216	..	38	575	114	·19841	3·97
85	173	..	36	461	95	·20619	3·83
86	133	..	29	366	77	·21053	3·70
87	88	..	17	289	61	·21097	3·55
88	68	..	17	228	48	·21277	3·36
89	49	..	9	180	39	·21645	3·13
90	34	..	8	141	33	·23419	2·85
91	25	..	9	108	28	·25907	2·57
92	14	..	5	80	23	·28736	2·30
93	9	..	2	57	19	·33333	2·03
94	7	..	2	38	14	·36765	1·78
95	5	..	1	24	10	·41667	1·54
96	4	..	2	14	7	·50000	1·30
97	2	..	1	7	4	·57143	1·07
98	1	..	..	3	2	·66666	·83
99	1	..	1	1	1	1·00000	·50

Life Assurance in England.

THE evils to which we adverted, in a brief article under the above title, in the sixth number of this *Magazine*, are attracting the attention which it was only reasonable to expect that sooner or later they must do. The disastrous consequences of the prevailing reckless competition which we then showed to be "looming in the future," begin already to assume a more definite and tangible shape. Convincing evidence is accumulating that the surface over which the operations of Assurance Societies are to range is for some years at least fully occupied, and that the attempt to extend it involves a cost which must render even success abortive. That this is so we regret as much as those can do whose efforts have been exerted in vain in this fruitless task. It is no subject of rejoicing—their disappointment, and the loss which those connected with them must inevitably sustain. As we said on the former occasion, we do not blame the projectors for making the trial, it was natural for each to think that he could do better things than those who had gone before; but they are surely to be blamed for perseverance in a course which is leading all engaged in it to ruinous consequences, when such a result is so obvious as not to be mistaken. Saying this, we allude of course to the extremely slow progress made in the acquisition of income, in spite of an enormous expenditure incurred with that object. In the older Companies, as a general rule, we believe the case was wholly different—probably at the end of the first year, half the premiums received in it were absorbed by expenses; at the end of the second, one-fourth (the income in the meantime having rapidly increased); and so on. But in the accounts of the Companies recently formed, it is by no means uncommon to see that at the end of three or four years not only all the premiums received have been swept away, but a considerable portion of the subscribed capital also; and what is a still more fatal symptom, the small income obtained from the assurances exhibits from year to year scarcely any perceptible increase; meanwhile an accelerating rate of mortality begins to operate, and what little advance would arise from the new entrants is neutralized by deaths, and by the secession of many who begin at length to perceive the hopeless character of the undertaking. These merely suffer the loss of whatever they may have subscribed; but the shareholders, less fortunate, find the claims accumulating without

any prospect of funds to meet them, and can escape the most serious ultimate consequences only by an immediate sacrifice scarcely less ruinous. That this is no exaggerated statement might easily be shown by comparison of the accounts of Companies formed some years back with those of such as have been more recently established; but we abstain from the unpleasing task of making it. We will not, however, conclude these few observations without remarking, that a great deal of the evil now complained of is to be attributed to the defective manner in which the accounts of these modern societies are set forth. This remark is made by more than one of the writers of the pamphlets calling attention to the existing state of affairs; but, curiously enough, none of them make use of the instrument whose utility they seem so sensible of. One gentleman, in particular, points out with great effect the importance of a "balance sheet," and the insufficiency of a mere statement of receipts and payments; but, notwithstanding, omits to give even a single specimen of the results to be derived from the proper use of the former. Another appears to think it necessary to appeal to a public accountant to resolve difficulties which it is peculiarly an actuary's province to encounter, and which the functionary so referred to does not seem quite equal to surmount. It is indeed remarkable that the oldest Companies manifest a want of knowledge or great carelessness on these really important points. Many of them give out a mere cash account, with which the public has nothing to do, and from which it can derive no useful information; and scarcely one does as it is imperatively necessary that it should, viz.—*first state the receipts of the year, and the charges of it, and then append a "balance sheet."* Had this method of procedure been resorted to in the recent discussions which have taken place, more light would have been thrown upon the subjects in dispute, and much unnecessary wrangling avoided. Not to make any invidious selection, we will take a supposititious case, resembling such as are given in Mr. Christie's pamphlet, and assume the receipts and expenditure to be as follows, viz.:—

Receipts of the Year.	£.	Charges of the Year.	£.
Paid up capital	27,000	Expenses	22,000
Premiums	13,500	Claims	7,000
Annuities	4,500	Annuities	350
		Interest, &c.	1,173
		Balance	14,477
	£45,000		£45,000

With these data, and assuming that two-thirds of the premiums

received are sufficient to meet the claims, we arrive at the following:—

Drs.	BALANCE SHEET.	*Crs.*	
	£.		£.
Paid up capital	27,000	Investments, &c.....	14,477
Liability under assurances ..	2,000	Balance (deficit)	18,673
" " annuities ..	4,150		
	£33,150		£33,150

This is, of course, merely intended as an approximation to the real state of affairs; but it will serve to show how such approximations may be made, and in what a very different point of view the subject matter is exhibited by them. In the present instance, the liability under the assurances (found from deducting the claims from two-thirds of the premium) is evidently understated. On the other hand, it is to be borne in mind that somewhat less than one-third of the future premiums may be looked upon as a set off against future expenses; or, what comes to the same thing, that rather more than two-thirds of them will in all probability suffice for the claims.

X.

London Fires in 1851.*

"The statistics of London fires are by no means devoid of interest, and the time may come when they will form an index to the social advancement of the people; for in proportion as houses are built more and more fireproof, and habits of carefulness become more and more diffused, the number of destructive fires will assuredly lessen."—*Knight's London.*

THE known fires in the Metropolis during the year 1851 numbered 928; the unknown (save to the parties interested), there is every reason to believe, amounted to a much larger number. Of the former, 270 were extinguished by the inmates of the premises without external aid; 398 were extinguished by the inmates assisted by casual voluntary aid; while the extinction of 260 devolved upon the firemen. The total number of calls given at the engine-stations were 1,159, as shown by the following table:—

* From the Report in the *Mechanics' Magazine*, March 27th, 1852, by Mr. W. Baddeley, C.E., Inventor of the Portable Canvas Cisterns; Improved Jet-spreaders; Farmer's Fire-engine; Every Man his own Fireman; &c. &c.

Months.	Number of Fires.	Fatal Fires.	Lives Lost.	Chimneys on Fire.	False Alarms.
January	63	1	3	9	9
February	65	1	1	10	8
March	80	3	4	13	10
April	65	0	0	9	13
May	81	5	8	12	5
June	82	0	0	9	10
July	74	0	0	10	10
August	77	1	1	3	9
September.. ..	89	1	1	7	8
October	62	2	2	10	11
November.. ..	83	2	3	13	13
December	107	5	5	11	9
Total ..	928	21	28	116	115

Instances in which insurances were known to have been effected upon the building and contents	464
Upon the building only	145
Upon the contents only	42
No insurance	277
	928
Alarms from chimneys on fire	116
False alarms	115
Making the total number of calls	1159

The number of fatal fires exhibits an increase on those of the previous year, and the number of lives lost is much greater. The fatal fires may be classed as follows:—

	Fires.	Lives lost.
Personal accidents from the ignition of wearing apparel	10	10
Intoxication	6	7
Bedding accidentally ignited	2	2
Explosion of gunpowder	1	2
Inability to escape from burning buildings	2	7
	21	28

The Royal Society for the Protection of Life from Fire have been eminently successful in their operations during the past year; their fire-escape conductors having been in attendance at 249 fires, and effected the saving of 24 lives.

The following list shows the occupancy of that portion of the premises in which the fire originated; illustrating the comparative liability to accident by fire of the various trades, manufactories, and private dwellings.

Occupation.	Totally destroyed.	Considerably damaged.	Slightly damaged.	Total.
Apothecaries (no laboratories)	...	2	...	2
Accoutrement-makers, army	...	1	...	1
Bakers	1	1	9	11
Ditto, sea biscuits	...	2	...	2
Barge and boat builders	...	1	1	2
Basket-makers	1	...	...	1
Bath-keepers	...	1	...	1
Beer-shops	...	3	12	15
Blacking-makers	...	...	1	1
Booksellers, binders, and stationers	..	2	6	8
Bottle-merchants	...	1	...	1
Brewers	...	2	...	2
Brokers, and dealers in old clothes	...	3	5	8
Builders	3	5	3	11
Butchers	...	...	1	1
Cabinet-makers	...	5	7	12
Calenderers	...	1	...	1
Caoutchouc-manufacturers	...	...	1	1
Carpenters, and workers in wood (not cabinet-makers)	...	17	19	36
Chandlers	1	3	10	14
Charcoal and coke, dealers in	...	...	1	1
Cheesemongers	...	5	3	8
Chemists (including laboratories)	...	1	1	2
Churches	...	...	1	1
Cigar-makers	...	1	1	2
Coach-makers	...	1	1	2
Coal-merchants	...	...	1	1
Coffee-roasters	...	...	2	2
Coffee-shops and chop-houses	...	4	9	13
Confectioners and pastrycooks	...	2	2	4
Coopers	...	1	3	4
Cork-cutters	...	1	...	1
Corn-chandlers	...	3	1	4
Cotton wool, workers in	...	...	1	1
Curriers and leather-dressers	...	...	1	1
Distillers, spirit	...	2	...	2
——— tar	...	1	1	2
Drapers, linen, woollen, and mercers	1	11	11	23
Druggists, wholesale	...	1	2	3
Dwellings, private	1	43	332	376
Eating-houses	...	...	7	7
Exhibition, the Great	...	...	1	1
Farms	1	6	...	7
Fellmongers	...	1	...	1
Felt-makers	...	1	...	1
Firewood-manufacturers, patent	1	1	...	2
Firework-makers	...	2	1	3
Fish-curers	...	2	1	3
Furriers and skin-dyers	...	2	...	2
Gaming-house	...	...	1	1
Gas-works	...	...	1	1

Occupation.	Totally destroyed.	Considerably damaged.	Slightly damaged.	Total.
Glass-blowers	...	...	1	1
—— cutters	1	...	2	3
Glass and emery paper makers	...	...	1	1
Glue-makers	...	...	1	1
Grocers	...	7	7	14
Gutta-percha-manufacturers	...	...	1	1
Hat-makers	...	3	2	5
Horse-hair-merchants	...	...	1	1
Hotels and club-houses	...	1	7	8
Japanners	...	4	2	6
Lampblack-makers	...	...	1	1
Laundresses	...	1	...	1
Lucifer-match-makers	...	2	2	4
Marine stores, dealers in	...	3	4	7
Mills, steam	...	...	2	2
Milliners and dress-makers	...	4	10	14
Musical instrument makers	1	2	1	4
Nurserymen	...	1	...	1
Oil-works	...	2	...	2
Oil and colourmen (not colour-makers)	...	6	4	10
Painters, plumbers, and glaziers	...	...	2	2
Paper-stainers	...	1	...	1
Parchment-makers	...	1	...	1
Pasteboard-makers	...	1	...	1
Pawnbrokers	...	...	1	1
Perfumers, manufacturing	...	1	...	1
Pork-butchers	...	1	5	6
Potteries	...	2	...	2
Preserved provision-manufacturers	...	1	...	1
Printers	...	6	10	16
———, muslin	...	...	1	1
Public buildings	...	...	1	1
Public places (not theatres)	...	2	2	4
Rag-merchants	...	...	1	1
Railways	...	1	4	5
Rope-makers	...	...	1	1
Sack-makers	...	1	...	1
Sale shops and offices	1	7	26	34
Saw-mills, steam	...	1	6	7
Schools	...	2	2	4
Scum-boiler	...	...	1	1
Ships	...	...	3	3
Ship-builders	...	...	2	2
—— chandlers	...	...	1	1
Soot-merchants	...	...	3	3
Stables	2	8	9	19
Straw-bonnet-makers	...	...	1	1
Tailors	...	...	1	1

Occupation.	Totally destroyed.	Considerably damaged.	Slightly damaged.	Total.
Tallow and wax chandlers, melters, and soap-boilers	...	4	3	7
Tanners	...	3	...	3
Timber-merchants	...	1	...	1
Tinmen, braziers, and smiths	1	4	11	16
Tobacconists	...	1	3	4
Toy warehousemen	...	...	1	1
Under repair, or building	3	4	10	17
Upholsterers	...	1	2	3
Varnish-manufacturers	...	2	1	3
Victuallers, licensed	...	14	14	28
Wadding-manufacturers	...	1	...	1
Warehouses	2	1	2	5
———, French fancy	...	1	...	1
———, furniture	...	1	...	1
———, Manchester	...	...	1	1
Waterproof canvas-maker	...	2	..	2
Weaver, carpet	...	...	1	1
———, willow	...	...	1	1
Wharfs	...	...	1	1
Wine and spirit merchant	...	...	7	7
Workshops (not hazardous)	...	1	1	2
TOTAL	21	255	652	928

The daily distribution of last year's fires was as follows :—

Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	Sunday.
135	134	149	123	126	150	111

Their distribution through the hours of day and night has been in the following proportion :—

	First hour.	Second hour.	Third hour.	Fourth hour.	Fifth hour.	Sixth hour.	Seventh hour.	Eighth hour.	Ninth hour.	Tenth hour.	Eleventh hour.	Twelfth hour.
A.M.	60	49	41	32	18	21	20	15	16	21	19	23
P.M.	31	23	21	23	41	35	55	65	75	91	78	55

The causes of fire, so far as could be satisfactorily ascertained, may be stated as follows :—

Accidents, unforeseen, and for the most part unavoidable	9
Apparel ignited on the person	11
Aërolite	1
Candles, various accidents with	87
——— ignited bed-curtains	75
——— ignited window-curtains	73
Carelessness, palpable instances of	17
Charcoal fires	2
Chicory-roasting	1
Children playing with fire	11
——— lucifers	7
Cinders put away unextinguished	9
Coke ditto ditto	1
Coppers improperly set	9
Fire sparks	59
Fires kindled on hearths and other improper places	9
Fireworks, making	2
——— letting off	3
Flues, foul and ignited	34
——— in adjoining houses	11
—— defective or overheated	35
—— of hot-air stoves	4
—— blocked up	8
Fumigation, incautious	5
Furnaces	16
Gas, escape of, from defective fittings	46
——— street mains	1
—— burning too high, or in proximity to inflammable goods	14
—— stoves	2
—— fittings, repairing of	3
Gunpowder, explosion of	1
Hearths, defective	3
——— fires raked out on	5
Intoxication	13
Kiln	1
Lamps, oil	3
Lamps, naphtha	5
Lime-slacking	9
Linen, drying or airing before fire	55
Locomotive engines, sparks from	7
Lucifer-matches, making	3
——— using	7
——— accidentally ignited	2
Oil, boiling of	3
Ovens, defective, overheated, &c.	4
Pitch and tar, boiling of	9
Reading in bed	3
Shavings, loose, ignited	39
Smoking meat and fish	5
Spirits, bottle of, bursting by heat	1
Spontaneous ignition of dung	2
——— hay	1
——— lampblack	3
——— lucifers	1
——— oily rubbish	5
——— rags	3
——— tan	1
Stills (1 illicit)	2
Steam-boiler, heat from	3
Steam, bursting of	1
Stoves, improperly set, defective, and overheated	27
——— drying	
——— ironing	7
——— pipe	8
Suspicious	13
Tallow and wax, melting of	4
Tobacco, thrown about unextinguished	29
Varnish, boiling of	3
Wilful	19
	887
Unknown	41
Total	928

It will be seen that one fire is attributed to the fall of an aërolite. This happened September 20th; on which evening, at about half-past 9 o'clock, a brilliant meteor was seen to pass rapidly through the atmosphere, apparently in a state of intense ignition, and fall at the back of the houses in Mount Row, Westminster Road. In about ten minutes afterwards, the workshops of Mr. Downey, picture-frame maker, were discovered to be on fire, from some otherwise unknown cause, and were entirely destroyed before any assistance could reach the spot. The dwelling-house, although much injured, was saved by the firemen.

Sparks from locomotive engines have, during the year, caused several serious conflagrations—an evil which was foreseen when railways were first proposed to be introduced into the heart of the

metropolis, and which occasioned the exclusion of locomotives, in the first instance, from the Blackwall line. Of late, however, they run to and fro, snorting and belching forth fire as if it were the most harmless thing in nature; while the blissful ignorance of people appropriates the arches of the railway, and the open yards along either side of the line, to the depository of hay, straw, timber, and other highly combustible matters! Did the reader ever, on a dark night, while travelling by rail, notice the manner in which the burning coke from the furnace of the locomotive is thrown about? Occasionally, struck by the spokes of the rapidly-revolving wheels, the burning mass is projected through the air to a distance of many yards, igniting whatever combustible is within reach.

A conflagration of this origin, September 18th, destroyed a valuable stock of deal, mahogany, and other wood on the premises of Mr. Robinson, North Street, Bethnall Green, seriously injured four arches of the Eastern Counties Railway, and destroyed the electric telegraph wires and posts.

Several of last year's fires were proved to have been wilfully occasioned, and in some cases the incendiaries were brought to justice. In one instance of *carelessness*, the Act of Parliament which imposes a penalty of £1,000, or imprisonment for eighteen months, on any servant negligently setting fire to a house or outhouse, was put in force. It appeared that, on the 18th of October, a carpenter named Burridge was covering the roof of a shed in St. Ann's Place, Limehouse, with canvas and pitch. Whilst Burridge was engaged upon the roof, the pitchpot boiled over, and set fire to the premises, which were in the occupation of Mr. Chapman, potter, and before assistance could be obtained they were destroyed. The premises belonged to Mr. Flight (proprietor of the "Preserver Fire Office," and consequently his own insurer), who charged Burridge with negligently causing the loss which fell upon him before Mr. Yardley, the magistrate.

Mr. Yardley observed that the statute was a highly penal one, and it was important that servants and labourers should know the serious responsibilities incurred by negligence in case of fire; in the present instance, an extensive loss had been occasioned by the carelessness of the defendant, who left a pot of pitch on the fire without anyone to watch it. Taking into account the defendant's previous good character, and the great exertions he made to endeavour to extinguish the flames, the magistrate inflicted a mitigated penalty of £10.

Fires are continually occasioned by domestic animals, cats, dogs, rats, &c.* The past year presented a novelty in the

Remarkable Discovery of a Fire by a Horse.—On Thursday, February 13th, about 1 A.M., intelligence was given at the fire-engine stations in London that a fire had broken out in Grove Street, Deptford, at the "Ship Defiance," public house. This fire was, however, promptly extinguished by the inmates and police. The messenger who gave the alarm at the West of England Fire-engine Station made a mistake, saying *Globe* Street. The engine was instantly horsed and started; and *Globe* Street, Deptford, not being known to the firemen, they kept the high-road, trusting to the receipt of more precise and accurate information as they approached Deptford. Proceeding along at their usual rapid rate, they reached High Street, Deptford, when all of a sudden one of the engine-horses came to a dead stop, and refused to move a step further. Encouraging words and the whip were resorted to, but the only result was the horse's throwing himself on his haunches. Surprised at this extraordinary occurrence, curiosity was excited, when one of the firemen, addressing Mr. Connorton, the Superintendent, exclaimed—"Good God! *this* house is on fire," pointing at the same time to the house opposite which the horse had so unaccountably stopped. The premises in question belonged to Mr. Wright, seedsman and corn-chandler, and on looking through the fanlight, the fire was found raging in the shop. The firemen instantly roused the neighbours; and having collected a number of pails filled with water, they then broke open the shop door, and had nearly extinguished the fire before the policeman on the beat knew of the occurrence.

The Fires of the Year were undoubtedly those which destroyed the warehouses of Alderman Humphrey, in Tooley Street and Montague Close, Southwark; the former of which broke out on Wednesday, February 19th, at 3 A.M.—the latter on Monday, June 23rd, at 4 o'clock in the afternoon. The first fire commenced in the dwelling-house of Mr. Wigan, hop-merchant, in Duke Street, from whence it travelled into the extensive warehouses behind. The great height of these premises from Tooley Street rendered it impossible to throw any quantity of water on to the upper floors, and the flames raged with uncontrolled fury for several hours. As the fire progressed downward, it came within the range of the engines; but by that time the accumulated mass of burning matter defied extinction. The two floating engines, and nine land engines be-

* A case of incendiarism by a jackdaw has just been reported.

longing to the London Brigade, and one belonging to the West of England office, were kept at work for hours to prevent the fire from spreading to the extensive oil stores and other inflammable property contiguous, and in this they were successful; but it was many weeks before the fire was wholly extinguished.

The second fire began in one of four warehouses marked A, B, C, and D—being first seen in the third floor of the eastern warehouse, A, in the rag-stores of Messrs. Hollingsworth, from whence the flames spread with great rapidity. The two floating engines, eleven land engines of the Brigade, the *West of England* engine, and one from Messrs. Barclay's brewhouse, were promptly in attendance and got into operation, but under most disadvantageous circumstances, owing to the scanty supply of water within any reasonable distance of the fire. The great length of hose attached to the land and floating engines made it exceedingly difficult to offer any effectual check to the progress of the flames. The warehouse A was almost entirely destroyed, and a large portion of the warehouse B, by 7 o'clock, by which time however the firemen had got the mastery, and no further damage was anticipated. To the consternation of all present, however, it was discovered that another distinct fire had broken out in the fourth (D) warehouse. The firemen, exhausted by four hours' arduous labour, were quite unable to meet this unexpected demand for renewed exertion, and the increased distance from the water supply magnified the difficulties of their position. The engine from Messrs. Barclay's brewhouse, being most advantageously placed in front of the D warehouse, was worked with much spirit, but unfortunately produced no effect upon the flames, which raged most furiously, burning downward from floor to floor with surprising rapidity. The intense heat speedily ignited the scaffolding of the Hibernia Wharf, which was rebuilding; and but for the activity and well-directed exertions of Mr. Connorton with the *West of England* engine, the whole range of premises on the river side would assuredly have been destroyed. The admirable working of this engine, and its skilful management, had been the subject of universal approbation in the early part of the afternoon; but these performances were eclipsed by those of the later and more trying emergency of the evening. In consequence of the great number of hours this fire was burning, an immense crowd of spectators had assembled—many of them foreigners and men of science—who were not very favourably impressed with the operations of the London firemen, acting as they were under the greatest disadvantages, and in numbers wholly inadequate to the

requirements of such a conflagration; — there were but fifty present!

The Risks of Fire Insurance are still far from settled; what with a disposition to excessive competition on the one hand, reducing the rates too low, and the efforts of monopoly to keep them too high on the other, but little progress towards an equitable adjustment has yet been made. It was remarked by the newspaper press, that "the Insurance Offices reaped a bountiful harvest out of the *Exhibition.*" The *actual risk,* in a building composed almost entirely of iron and glass, filled with articles five-sixths of which were incombustible, guarded day and night by firemen, police, and sappers—throughout which a supply of water, under pressure, was judiciously disposed, and within which about fifty fire-engines of one sort and another were located—could not have been very great!

One shilling per cent. (for six months) would have been ample compensation for such an infinitessimal risk. The tariff agreed upon, and actually charged upon a large amount of property, was ONE GUINEA!!!

The Inefficiency of the present Floating Engines having long been notorious, and this fact having received a melancholy corroboration at the burning of each of Alderman Humphrey's warehouses, before narrated, it has been determined to apply steam power to one of them by way of experiment. The steam-engine is to be made available for working the fire-engines, as also for propelling the boat; but as neither paddle wheels nor screw are to be applied, probably propulsion by the jet will be attempted. It will be peculiarly unfortunate, after all, that in a vessel where speedy transit is of such vital importance, any imperfect system of propulsion should be resorted to; and the employment of a jet for that purpose (although the subject of several current patents) has never yet been found practically advantageous.

FOREIGN INTELLIGENCE.

AMERICA.—*Connecticut Mutual Life Assurance Company.—Sixth Annual Statement, for the Year ending January* 31*st*, 1852.

Receipts and Disbursements.

	£	£
Amount received for premiums and policies during the year	130,899	
Amount received for extra risks	7,295	
		138,194
" " Interest		10,369
		148,563
Deduct paid for salaries, medical examinations, postages, advertising, printing, stationery, furniture, rent, taxes, exchange, &c.	3,349	
Deduct paid for commissions	8,020	
" " policies surrendered	1,323	
" " losses on 115 policies, including £9,625 unpaid of last year	39,378	
		52,070
		96,493
Deduct losses on 18 policies not yet due, and waiting proof of death		5,610
Net proceeds		90,883
Dividend of 50 per cent. credited to life policies	61,507	
" 15 " term "	1,026	
		62,533
Balance to reinsurance and reserve fund		£28,350

Assets.	£
Bond and mortgage loans on real estate	35,214
Bank stock loans	9,734
Loans to City and other corporations	13,788
Mortgaged bonds, Bank and other stocks	13,051
Special deposits in banks, drawing 6 per cent. interest	24,000
Cash on hand and in bank	5,015
Premium notes bearing 6 per cent. interest	166,642
Premiums in the hands of agents and in transit	2,763
Accumulated capital	£270,207

Dividends paid during the year	£4,159	
" cancelled by forfeited and surrendered policies	8,249	
	£12,408	

Number of policies issued during the year, 2,699.

New Haven, Connecticut.—American Mutual Life Insurance Company.—Fourth Annual Report, for the Year 1851.—In compliance with the requirements of the charter of the Company, the trustees submit to the members, and to the legislature of the State, their fourth annual report.

Policies.

Issues per last report	2,700
„ in 1851	620
	3,320

Statement of Business for 1851.

	£
Amount on hand per last report	10,337
Deduct premiums unpaid on policies not taken	24
	£10,313

Receipts.

	£	
Received for premiums	17,790	
„ interest	804	
„ sea and climate risks	141	
		18,735
		£29,048

Disbursements.

Salaries	944	
Medical examiners' fees, a part for 1850	266	
Advertising	103	
Printing and stationery, a part for 1850	287	
Postage, express, and telegraph	114	
Commissions to agents	1,236	
Rents, fuel, travelling, and all other incidental and contingent expenses	318	
Profit and loss	42	
Scrip of deceased members redeemed	34	
Losses paid, per bill of mortality	5,600	
		8,944
Surplus		£20,104

Investments.

Mortgages in the city of New Haven on unincumbered, improved real estate, worth double the amount loaned	8,000	
Loans secured by stocks, bonds, and other collaterals	4,840	
Railroad bonds	1,600	
Cash not permanently invested	4,272	
Amount now being transmitted by agents	1,392	
		£20,104

Bill of Mortality and Losses paid in 1851.

State.	Cause of Death.	Amount Insured.
New York	Railroad accident	£200
„	Dysentery	600
„	Disease of the brain	600
„	Fever	600
„	„	1,000
„	„	400
„	Hæmatemesis	200
„	Aphthæ	400
„	Apoplexy	400
„	„	100
Massachusetts	Fever	200
„	——	200
„	Phthisis	600
New Hampshire	Disease of the Bladder	100
		£5,600

Residences of all the Persons Insured.

Maine	132	Georgia	4
New Hampshire	231	Alabama	3
Vermont	120	South Carolina	2
Massachusetts	659	Tennessee	1
Rhode Island	20	Kentucky	5
Connecticut	661	Dist. Columbia	3
New York	1,258	Ohio	67
New Jersey	90	Illinois	10
Pennsylvania	19	Michigan	21
Maryland	4	Canada	8
Virginia	3	Wisconsin	1
Louisiana	1	England	1
Florida	1	Other places	3
Delaware	2		
			3,320

Occupations of all the Persons Insured.

Persons not in business	79	Artists	26
Merchants, brokers, and traders	709	Printers	42
Mechanics and tradesmen	741	Farmers	105
Accountants, clerks, and agents	381	Master mariners	20
Manufacturers	160	Machinists and engineers	39
Attorneys	98	Hotel keepers	49
Physicians	87	Females	208
Clergymen	124	Factory operatives	21
Professors	21	Druggists	22
Students	75	Dentists	21
Teachers and superintendents	114	Painters	31
Army and navy officers	5	Labourers	39
Millers	6	Mariners	11
Editors	25	Other occupations	18
Public officers	31		
Cashiers	17		3,320

[In general we have confined ourselves in giving the statements of Assurance Companies to such facts only as bear upon their progress; but the following remarks in the report of this Company, showing the practical operation of the recent law in the State of New York, have a general interest which induces us to make the extracts.—Ed. *A. M.*]

The variety of Life Insurance Companies in Europe is very great, and they are now in successful operation. Some of them involve the greatest hazards to life and health, with rates and charges corresponding; and some are very exclusive and strict, with low rates, and from which an occasional dividend is made. Each class is supposed to be equally safe, for each is governed by established rates of mortality, ascertained by long experience.

In time, the same will be true in this country, unless life insurance is stifled in its infancy. Thus far the history of our Companies presents none of the lamentable results common in English history; on the contrary, they have paid their losses, and have not wandered so far from established standards that they cannot recover themselves. They are not blind to their own experience, and we believe they will profit by the past, and go on in well doing, until each Company becomes master of its plan of operation and system of business, and settles down on a reliable and permanent basis.

But it is certain that this era in life insurance cannot be realized, if the States severally take Life Insurance Companies out of the hands of their officers and trustees, and force them into state departments—there to

surrender the capital of which they are possessed, and become subject for ever to the inquisition of state actuaries.

Such a system, if carried out by the States, would make every Life Insurance Company a perfect variety shop, in plans, standards, and schemes, for it is almost impossible to find two actuaries whose theories, views, and opinions on life insurance correspond. Nor can the business of life insurance be sustained, if the several Companies are forced to confine their operations to one State; they need, and they all must have, the benefit of territory, sufficient to shield them from the blasting effects of epidemics, local diseases, and other occasional unfavourable circumstances, or the Companies must do a less prosperous business.

Every State should look after its own incorporations, and provide for their good management; and each State should concede to the other the right to require of each other's Companies, that do business with their people, such an exhibit of their affairs as will show their resources, income, losses, and expenses.

Compliance with the law of the State of New York, passed in the winter of 1849, involved the Company in the expenditure of nearly 5,000 dollars for additional capital, although it was then possessed of a guaranty capital of 50,000 dollars, composed chiefly of individual bonds for 1,000 dollars each, which bonds were severally guarantied by other parties equally responsible.

Although the Company was steadily advancing, and needed no additional strength, the trustees were compelled to withdraw the Company from the State, or to establish a new capital of 100,000 dollars, and invest it in such securities as the law pointed out.

In doing this the Company became possessed of two kinds of capital, both of which, of necessity, became a direct tax upon its income; and before the new contract for capital had terminated, the State passed another law, requiring not only another kind of capital, but the surrender of it to the State, as a special deposit for the exclusive use and benefit of policy-holders, citizens of that State.

On receiving a copy of the law and circular from the comptroller, the trustees referred the whole subject to a committee. After a thorough investigation of the matter, it was found that compliance with the law would involve the Company in the maintenance, for a time at least, of three separate kinds of capital: viz., the original guaranty capital of 50,000 dollars, the capital of 100,000 dollars under the law of 1850, and a deposit of 100,000 dollars, under the law of 1851, for the exclusive benefit of their own people. And how soon the State would make other demands, and add another "Act relating to Life Insurance Companies incorporated by other States," the trustees had no means of judging.

The committee, therefore, were of the opinion that no farther action connected with the subject could be had, with any prospect of advantage to the Company or its members, in the State of New York or in New England. Besides, the charter of the Company (section XI) expressly provides, that "all money, notes, and other securities received by and belonging to the Company shall be held by and under the control of the board of trustees."

In view of this provision in the charter and the foregoing considerations, the trustees, on the 18th of July last, adopted the following resolutions, and incorporated them in a circular to agents and policy-holders:—

"*Resolved,* That the board of trustees have no right to make such

special deposit as is called for by the law in question, as it would be virtually an assignment of so much capital for the exclusive benefit of a portion only of the policy-holders.

"*Resolved*, That this Company established its rates of premium and plan of operation after a thorough investigation of the whole subject of life insurance; and having at stated periods renewed their examinations, until they are fully satisfied with their position, deem it improper to submit the details and results of their investigations to the ordeal of 'any person or persons' in the employ of any state department out of this State; at the same time this Board are willing, annually, to make such an exhibit of the affairs of the Company as will show its resources, income, losses, expenses, and liabilities, and qualify to the same, for the information of any State in which they do business.

"*Resolved*, That while this Board feel a deep interest in all laws which are calculated to provide for the good management of Life Insurance Companies, and the protection of all the varied interests involved therein, they feel constrained to say, after full investigation and inquiry, prompted by a strong desire to meet the requisitions of the new law, that to comply with its extraordinary demands would involve an exercise of power which they do not possess."

It will be remembered, towards the close of the previous annual report, the trustees suggested that scrip be issued not oftener than every three or five years. During the past year we have endeavoured to ascertain the views of the members on this subject, and finding their views generally coincided with our own, the trustees have determined to issue scrip hereafter on every third year.

The annual dividends during these intervals will be placed to the credit of the members, on the members' ledger, and will be brought into scrip every third year.

In the scrip for the past year will be included the scrip issued heretofore; therefore all the dividends to the present time will be embraced in the new scrip, on receiving which the members will surrender all they hold for former years. The new scrip will draw 6 per cent. interest, and will be issued with interest-warrants attached, so that the holder can annually cut off a warrant, and receive the interest in cash, or apply it towards his premium. As the scrip is transferable without endorsement, it cannot be duplicated; the member therefore will take care of it, and not suffer it to be lost.

The dividend for the past year is 15 per cent. upon the earned premiums, the same as heretofore.

Boston.—New England Mutual Life Insurance Company.—Report of the Directors to the Members at the Annual Meeting, Dec. 1, 1851.

The Company has issued a few more policies than in the preceding year, and steadily added to its members. It has added in a still greater degree to its strength, by the substitution of a greater proportion of policies for the whole life instead of those for terms of years.

The number of deaths in proportion to the whole number of members has been below the tabular rate. Suppose the average age of members at the time of entering the Company to be thirty-six, which is near the fact, and assume that the present members, taking the earliest and latest together, have been in the Company on an average for four years, the deaths,

according to the experience of the oldest Insurance Companies, and the Carlisle Tables of Mortality, and others of greatest authority, should have been twenty-two. The actual number has been seventeen, making a difference in favour of the Company of over 22 per cent. This is only a proximate calculation, as any person skilled in such calculations will readily perceive; but it is near enough to show beyond all question a favourable rate of mortality during the year.

Another circumstance in respect to losses has been equally favourable, for, though one of them has been the largest that is ordinarily taken, yet the whole amount is less than the average for the same number of policies generally by about £2,400, without including extra risks of seafaring and climate, and the extra premiums for such risks. The average amount of our policies is about £480 each, which for twenty-one policies would give £10,080; the actual amount has been £7,600.

The descriptions of persons lost have been as follows:—

	Amount insured. £
3 merchants	2,600
3 mechanics	600
2 clerks	600
1 student	160
1 civil engineer	1,000
1 lieutenant U. S. Marine Corps	200
1 contractor	400
1 college professor	600
1 machinist	50
1 editor	200
1 manufacturer	1,000
1 lady	200
17 persons insured in 21 policies, amounting to	£7,610

Members will naturally feel an interest in the state of our accumulated fund, as one of the decisive indications of the condition of the Company. At the time of the distribution, three years ago, it was found that, after going through an examination of all the policies, and reserving an adequate fund for reinsurance on each one, and making an additional reserve for contingencies, and a partial provision for refunding our guaranty capital, we could make and actually pay a distribution of over £9,200—equal to 20 per cent. on the amount of premium paid in. The distribution of surplus, if made by additions to the amounts insured by all of the members, as it was to those who chose that mode, would have been from 25 to 62 per cent. of the amounts of premium previously paid in, according to the ages of the different members, as was stated in the report for that year. This is the way in which some Companies make all their distributions of surplus. At present, the state of this fund is as favourable, to say the least, as it was before that distribution.

A transaction of some importance has been the deposit of £12,000, being part of £20,000 required by a recent law of New York to be deposited with the Comptroller of that State by Insurance Companies doing business there. The investment has been made in a mortgage in New York city in compliance with the law. The additional deposit of £8,000 is required to be made by the first of next February.

Statement of the Business of the Company for the Year ending November 30, 1851.

		£
2,051	policies outstanding, November 30, 1850	942,099
343	„ issued	161,345
2,394		1,103,444
242	„ terminated	102,406
2,152		£1,001,038

21 policies have terminated during the year by death of the insured, of which 18, amounting to £7,250, were for the benefit of surviving families, and the 3 remaining, amounting to £360, were for the benefit of creditors.

Of the policies issued during the past year, 161 were for life, amounting to £83,740; and 182, amounting to £77,605, were for terms of years.

The ages of new members are as follows:—

Under 20 years	8	40 to 45 years	61
20 to 25 „	25	45 to 50 „	24
25 to 30 „	55	50 to 55 „	19
30 to 35 „	71	55 to 60 „	11
35 to 40 „	66	Over 60 „	3

The classes of new members are as follows:—

Merchants, traders, and brokers	136	Clergymen	14
Mechanics	47	Physicians and dentists	5
Clerks	22	Master mariners	6
Bank officers	5	Mariners	8
Manufacturers	28	Teachers	9
Lawyers	7	Engineers and machinists	6
Farmers	4	Editor	1
Students	7	Hotel keepers	3
Females	9	Government officers	6
Agents and superintendents	11	Miscellaneous professions	9

The residences of new members are as follows:—

New England States	270	Southern States	11
Middle States	31	British Provinces	1
Western States	30		

Exhibit of the Business and Property of the Company, November 30, 1851.

		£
Premium received on 343 policies		4,254
„ „ on previous policies		19,048
Received for additional premium		633
		23,935
Deduct amount of premium returned		661
		23,274
Add amount received for interest (including that on guaranty fund), dividends, and charge for policies		4,643
Total net receipts for the year		27,917
Losses since November, 1850	£7,610	
Interest on guaranty capital (paid Jan. 1851)	700	
Rent and salaries	900	
Advertising, printing, commissions to agents, postage, doctors' fees, stationery, and all other incidental expenses	946	
		10,156
Net accumulation for the year		17,761
Add „ prior		68,922
		£86,683

The property of the Company consists of

	£	£
Loans on mortgage	46,400	
Stocks	30,568	
Railroad bonds, due in July, 1852	1,940	
Loans on personal security	8,733	
Loan to City of Charlestown	4,000	
Real estate	1,000	
Premium notes	5,025	
Cash in Merchants' Bank	1,469	
		99,135

The Company owe as follows:—

Guaranty fund	10,000	
Balance of distribution	452	
Amount borrowed, payable January 1, 1852	2,000	
		12,452
		£86,683

Newark, New Jersey.—The Mutual Benefit Life Insurance Company.—Statement of Affairs on the 1st day of January, 1852.

		£	£
Balance per statement, January 1st, 1851		238,488	
Deduct for losses then unpaid, paid since		7,500	
			230,988
Net premiums received during the year 1851		92,301	
Interest " " "		13,035	
Total receipts, 1851		£105,336	
* Paid losses of the year	£20,660		
" for purchased policies	6,094		
" salaries, taxes, postage, &c.	3,619		
" commissions	5,585		
" physicians' fees	438		
		36,396	
			68,940
Balance			£299,928
Paid on dividend of 1847		808	
" " 1848		2,679	
" " 1849		17,949	
Paid interest on dividends		2,290	
			23,726
Net balance, January 1st, 1852			£276,202

Assets.

Cash on hand	£8,508	
Newark City 6 per cent. bonds	230	
Brooklyn " "	10,000	
Albany " "	5,000	
Bonds and mortgages on real estate, worth double the amount loaned	103,673	
Real estate in Newark	3,394	
Premium notes drawing 6 per cent. interest	141,996	
Loans on scrip	1,490	
Premiums, premium notes, and cash in the hands of agents	1,911	
		£ 276,202

* Losses unpaid, awaiting proofs of death, £6,460.

	£
Net accumulation	276,202
Amount of dividends and interest paid out of previous accumulations to date . . .	38,428
	£314,630

Upon the policies now in force, issued prior to January 1st, 1851 (except term policies issued since May 1st, 1848), the directors have declared a dividend of 35 per cent., without interest, on the premiums paid at the table rates, being the profits of 1850, payable in conformity with the present rules of the Company.*

The directors, having reserved the sum of £131,417, and the additional sum of £40,000 of declared profits, as required by the by-laws, have from the surplus ordered the payment of the *fourth dividend*, being that declared January 1st, 1850, the same to be paid to the members at the time their annual premium comes due during the year 1852. Those holding scrip of 1850, to be allowed the same as cash in payment of premiums; and those whose dividends have been placed to their credit, to receive the same by a credit on their notes as they mature.

New York.—Mutual Life Insurance Company of New York.—Statement of the Affairs, May 1st, 1851.

Amount of accumulated fund		£269,736
Investments.		
Cash on hand and in bank	£6,566	
Bonds and mortgages on real estate in the State of New York	237,646	
United States Stocks (par value £21,988 cost) . .	23,137	
New York City Corporation Stocks (par value £400 cost)	447	
Suspense account (disputed taxes, &c.)	814	
Due from agents	1,126	
		£269,736

Number of policies in force, as per below, 6,305.
Amount of risk thereon, £3,177,236.

When issued.	Life Policies.		Term Policies.	
	No. now in force.	Amount at risk thereon.	No. now in force.	Amount at risk thereon.
		£		£
Feb. 1, 1843, to Feb. 1, 1844	172	111,580		
„ 1844, „ 1845	235	153,458	45	28,500
„ 1845, „ 1846	457	262,780	78	50,590
„ 1846, „ 1847	515	247,726	95	53,730
„ 1847, „ 1848	803	426,933	157	81,050
„ 1848, „ 1849	783	369,105	190	97,700
„ 1849, „ 1850	965	471,920	344	158,400
„ 1850, „ 1851	938	419,420	262	136,035
„ 1851, to May 1, 1851	187	73,790	69	34,520
	5,065	£2,536,712	1,240	£640,525

* In scrip to those who have paid their premiums in cash, and to the credit of those who are indebted to the Company by note for part of the premiums.

Amount received for premiums for the year ending May 1st, 1851 .	£88,155
„ „ interest	12,068
„ of losses during same period	31,708
„ „ remaining unpaid	6,660
„ expenses during same period	9,019
„ annuity fund	646
„ premium notes held by the Company	nil
„ unpaid dividends declared and payable on the death of the assured	58,580
„ fund reserved for reinsurance*	201,849

Number of policies in force in the State of New York, as per below, 3,150.
Amount at risk thereon, as per below, £1,584,133.
Amount of premiums received thereon for the year ending May 1st, 1851, £50,139.

When issued.	Life Policies.		Term Policies.	
	No. now in force.	Amount at risk thereon.	No. now in force.	Amount at risk thereon.
		£		£
Feb. 1, 1843, to Feb. 1, 1844	148	100,300		
„ 1844, „ 1845	129	74,728	29	19,100
„ 1845, „ 1846	220	120,200	38	24,470
„ 1846, „ 1847	211	95,870	46	29,060
„ 1847, „ 1848	457	247,860	91	40,770
„ 1848, „ 1849	360	176,380	84	36,340
„ 1849, „ 1850	446	217,170	183	78,070
„ 1850, „ 1851	441	200,600	150	70,095
„ 1851, to May 1, 1851	80	33,880	37	19,240
Total . .	2,492	£1,266,988	658	£317,145

Life policies .	2,492	Amount at risk thereon . .	£1,266,988
Term „ . .	658	„ „ . .	317,145
Total .	3,150	Total . .	£1,584,133

New York Life Insurance Company.—Seventh Annual Report.

			£
Amount of assets, as per statement of January, 1851 . . .			70,951
During the year 1851, 1,329 policies have been issued. The premiums during the same period amounted to . .	£ 60,615		
Amount received for interest	3,741		
		64,356	

Disbursements.

	£		
Amount paid for losses by death, less discount for payments in advance	31,411		
Amount paid for expenses, viz.:—			
Salaries, fees to physicians, trustees, clerk-hire, &c.	2,024		
Advertising, office rent, furniture, printing, stationery, &c.	1,012		
Commissions, postages, medical examinations, exchange, &c.	7,572		
Interest on dividends, dividend on subscription notes, reinsurances, &c.	932		
Taxes	699		
Return premiums allowed on cancelled policies .	307		
		43,957	—20,399
			£91,350

* This amount includes the reserve fund of February 1, 1848, with the net accumulations since that time; a part of which will be shown to be profits at the next dividend 1853.

Assets.

	£
Invested in United States and New York State Stocks, in accordance with the Charter	37,171
Cash on hand	5,216
Bonds and mortgages	12,516
Notes received for 40 per cent. on life policies	35,003
Premiums on policies in hands of agents	1,444
Total amount of accumulated capital	£91,350

The Board of Trustees have declared a dividend of 40 per cent. on policies for the whole term of life, and 6 per cent. interest on former dividends.

New York Life Insurance and Trust Company.—Report of the Committee, appointed by the Trustees, for the purpose of examining the books, vouchers, and documents in the Office, previous to declaring a dividend on the 3rd day of February, 1852.

The committee report, they have compared the bonds and mortgages in the office with the entries, and find them correct; and

		£
The loans amounted, on the 31st of January, 1852, to		627,009
On bills receivable	£292,815	435,122
On stock loans	142,307	
Certificate of United States Stock owned by the Company for £10,000, also a certificate of the Comptroller of the State of New York, for £20,000 U. S. 6 per cent. Stock of 1856, deposited with him under the Act of the legislature, passed April 8, 1851, in reference to life insurance		26,794
Balance to the debit of the respective accounts as follows, viz.:—		
Country banks		7
Insurance account, bond and mortgage		450
Receivorship account		6,723
Matheson & Co.		3,404
Suspense account		12
Real estate owned by the Company		23,121
Cash in the Bank of the State of New York		18,333
Due and accrued on the 31st January, 1852, as interest on the following accounts:—		
Receivorship account, bond and mortgage, bills receivable, stock loans, stock owned, rent account		11,016
		1,151,991
Deduct depreciation on loans		3,220
Value of assets, January 31, 1852		£1,148,771

The liabilities of the Company on the 31st January, 1852, as follows, viz.:—

	£
Capital	200,000
Deposits in trust	585,268
Trusts of accumulation	148,065
Life insurance	62,460
Annuity granted	21,677
Premium account	3,303
Unclaimed dividends	45
Guardianship accounts	13,078
Contingent accounts	2,885
Carried forward	£1,036,781

Brought forward . . .	£1,036,781
Due by the Company as interest accrued on the 31st Jan., 1852:—	
Interest on deposits, trust of accumulation, & guardianship accounts	52,146
„ on life insurance	310
„ on annuity granted	108
„ on premium account	17
Taxes for one month, estimated	161
	£1,089,523

Leaving a surplus of profits, on the 31st of January, 1852, of £59,248

The committee are of opinion it will be proper to declare a semi-annual dividend of 4½ per cent. on the capital stock of the Company, payable on and after the 10th instant, which will leave a surplus of earnings on the 1st of February, 1852, of £50,248.

The Company insures lives, grants and purchases annuities, and makes any other contracts involving the interest of money and the duration of life.

Deposits.—The Company allows interest on deposits, payable upon 10 days' notice, 3 per cent. per annum; for 2 years and over, 5 per cent.; for 6 months, 4 per cent.; on all deposits by the Court of Equity and Surrogates, 5 per cent.; and on all deposits intended for accumulation, such interest as may be agreed on.

Philadelphia.—United States Life Insurance, Annuity, and Trust Company.—The First Annual Report.

Whole number of policies outstanding, December 31, 1851, 632.
Whole amount of insurance thereon, £269,254.

		£
Whole amount received from premiums, interest, and on policies .		10,148
Disbursements.		
Amount of two losses paid	£533	
Amount paid for office rent, salaries, stationery, commissions, postage, advertising, State taxes, &c.	2,213	
Amount paid for reinsurance	89	
		2,835
Amount of fund reserved for reinsurance		7,313
Amount of capital		50,000
Amount liable for losses, January 1, 1852 . .		£57,313

Investments and Assets.

	£
Bonds and mortgages on real estate, United States 5 and 6 per Cent. Loans, payable in 1853, 1856, and 1867	21,076
Subscription notes	28,924
Loans on stocks	478
Cash on hand and in bank temporarily	1,889
Amount loaned at New Orleans branch-office on collaterals, bearing 8 per cent. interest, well secured	2,626
Semi-annually and quarterly premium payments	1,305
Premium notes held by the Company	Nil
Due from agents	1,015
	£57,313

After careful reservation of a sum sufficient for the reinsurance of all outstanding risks, the directors have much satisfaction in finding that they are warranted in declaring a bonus of 20 per cent. on premiums received up to the date of this statement, upon all policies entitled thereto; which will either be added to the amount insured, and be payable at death, or else

the present value in *money* will be paid to each policy-holder at his or her option.

The expenses of office and management are relieved by having an equitable proportion borne by the saving fund and trust department of this Company, now in very successful operation.

FRANCE.—*On the combination of Mutual Fire Insurance Companies for the purposes of Reinsurance, &c.*

Nous disions, dans notre numéro de Septembre, 1851: "Si la France était couverte d'associations départementales, administrées chacune séparément, mais reliées entre elles par une garantie commune, on arriverait au maximum de la garantie, au meilleur mode, et aussi au mode le plus économique d'administration."

En écrivant ces lignes, en indiquant dans le même article les moyens à l'aide desquels il était permis de préparer aux intérêts de la mutualité toute la prospérité que ce principe comporte, nous savions être l'écho du plus grand nombre des directeurs de sociétés, et nous pourrions même citer quelques-uns d'entre eux comme ayant élaboré utilement les questions qui se rattachent à l'objet de l'article précité.

Nous espérions que ces idées générales, qui témoignaient, il faut le reconnaître, d'un besoin bien réel en matière d'assurance contre l'incendie, ne resteraient pas stériles; et, en effet, nous avons été informé de la création d'une nouvelle société, le *Centre mutuel*, qui prépare la réalisation d'une garantie générale entre toutes les sociétés.

Nous le dirons cependant, le *Centre mutuel* ne répond pas complétement au but que nous avions en vue; il ne présente pas, au moins quant à présent, les éléments constitutifs à l'aide desquels on puisse relier entre elles par une garantie commune les différentes sociétés, dont l'isolement absolu est un des graves inconvénients de l'organisation actuelle de la mutualité.

Mais, nous l'avons compris, en assurance de même qu'en toute autre matière, il ne faut procéder qu'avec mesure, et, quant à nous, il nous suffit d'apercevoir un progrès pour que nous y applaudissions.

Nous applaudissons donc sincèrement à la venue du *Centre mutuel*, car il remplit au moins une lacune importante, l'absence de tout moyen, pour ainsi dire, de pratiquer la réassurance *en mutualité*. Il est toujours fort dangereux que des risques élevés restent sous la garantie d'une seule société, car vienne une perte totale, et le sinistre se traduit en de fortes contributions à payer par les sociétaires.

Notre intention n'est pas de traiter aujourd'hui de la réassurance mutuelle, et de tout ce qu'on en peut attendre pour le développement et la solidité des sociétés; c'est un sujet vaste et de la plus haute importance, auquel nous reviendrons. Mais nous avons tenu à constater la première réalisation d'une idée que nous croyons féconde, et l'établissement d'une société qui, si elle reçoit les développements que le temps peut y apporter, est appelée à asseoir sur ses plus solides bases l'édifice de la mutualité.

L. LE HIR, *Journal de l'Assureur et de l'Assuré.*

Mutual Assurance against Hail.—When we compare the value of agricultural produce which is exposed to damage by hail, and the amount actually insured against loss thereby, we are struck with the wide disproportion which exists. It is calculated that in France there are

		£
13,900,262 hectares (1 hectare = 2,471 English acres) of corn lands		82,219,513
3,442,139 hectares of different culture—potatoes, buckwheat, beetroot, flax, hemp, tobacco, &c.		32,142,760
1,972,340 hectares of vineyards—produce in wine and brandy		19,123,532
The quantity of cider and beer is valued at		9,698,314
22,729,103 hectares of grass land, pasturage, and fallow lands		33,636,542
8,804,551 hectares of woods and forests		8,264,021
Total, 50,848,395 hectares, the produce of the soil * in France	valued at	£185,084,683
	quoted as	£181,083,883

These values are taken from the official statistics of M. Moreau de Jonès, who however regards them as below the truth. We may safely value the riches of the soil of France at £200,000,000 sterling. Of this amount not so much as £8,000,000 (scarcely a twenty-fifth part) is insured.

The amount insured is subdivided amongst the Companies as follows:—

	£
La Cérès, of Paris	2,240,000
La Versaillaise, ditto	1,040,000
La Société Mutuelle de Seine et Marne	1,000,000
L'Etoile, of Paris	960,000
La Toulousaine	840,000
La Mutuelle, de l'Aisne	480,000
	£6,560,000
La Ligerienne Tourangelle, La Providence Agricole, L'Assurance Générale, of Paris, L'Iris et La Province de Toulouse, L'Arc en Ciel, de Mulhouse, L'Amicale, de Perigueux, La Drouaise, de Dreux	about 1,440,000
	£8,000,000†

Thus the benefit of insurance against hail is confined to not more than 4 per cent. of the agricultural produce of France. Nevertheless, the risks from hail are probably the most considerable of all. They greatly surpass the risks from fire, especially if the relative damage by either of these destructive causes be compared with the total amount assured. In fact, the value of property assurable against fire amounts to £4,160,000,000 ster-

* In adding to this value £74,822,895, the balance of agriculture in France amounts to £255,906,778; but this estimate is generally considered too low. M. Moreau de Jonès takes it at £280,000,000, and M. Millot at £320,000,000 sterling.

† In a report made to the Constituent Assembly on the 26th April, 1849, respecting a proposition of M. Pézerat, recommending that the insurance of this kind of property should be undertaken by the State, M. Loizet considered the amount insured by ten Mutual Hail Insurance Companies, the operations of which were known, to be about £7,696,315.

In a memorandum presented to the Council of State, in support of the application for authorizing L'Union Générale, M. de Boucheron gave the total of all the existing Societies, on the 1st January, 1846:—

		£
8 Societies, empowered to insure in	25 Northern Departments	6,380,000
3 " " "	30 Central Departments	580,000
4 " " "	32 Southern Departments	1,488,000
		£8,448,000

At the present time, the number of Companies and the amount insured has diminished.

ling. The total insured is only £1,400,000,000. The losses annually incurred by fire are £1,120,000; and the amount actually indemnified equals £560,000. But the value of property insurable against hail is only £200,000,000. The total value of the annual damage caused by hail is at least £1,200,000.* The value insured in 1845 was £8,440,000; and the losses which the Companies had to make good in the same year amounted to £73,217, or nearly one per cent. on the amount insured.

It appears, then, that so large an amount as £1,200,000 is annually lost to the unfortunate agriculturists by this destructive scourge; and all the relief that the Government affords does not amount to more than a few thousands a year. The most necessitous are not reimbursed more than 3, 4, or 5 per cent. of their actual losses.†

There is no Mutual Society for Insurance against Hail which does not give back to its members nearly the whole amount of the losses incurred. In most cases the damage is entirely made up. In these latter years, in which so much devastation has been caused, the members of societies, where the greatest difficulty has occurred, have received 90 per cent. at least. How is it that this kind of insurance is not more in vogue? In the present state of this branch of business, it is true, the contributions are heavy; but this is found to be the case principally in districts where the destruction is the most extensive, and the necessity for insurance the greatest. But even if the farmer has to pay 1½ or 2 per cent. to guarantee himself against such a fatality, is it not to his interest to make the sacrifice? When we consider, that if in place of £8,000,000 insured the amount had been ten times as much, the contribution might probably be reduced by one-half or four-fifths, we cannot but feel that the farmers show a lamentable degree of negligence, ignorance, and indifference.—L. Le Hir, *Journal de l'Assureur et de l'Assuré.*

New Table of Mortality, deduced from the experience of Benefit Societies.—One of the principal reasons why the system of life assurance has not attained in France the same development as it has in England, is

* M. Dumas, Minister of Agriculture, stated in the National Assembly, on the discussion held respecting M. Joret's proposition with reference to agricultural assurance, that he had caused an estimate to be made of the damage occasioned by hail, for several years. The damage amounted from £1,600,000 to £2,720,000, the average being £2,000,000 a year. It was contended by some of the representatives that the losses were exaggerated; and though M. Dumas was inclined to admit that fact, he still maintained that they could not be valued at less than from £1,600,000 to £2,000,000 annually.

From information furnished to the Ministère du Commerce by M. Du Boucheron, Directeur de l'Union Générale, it appears that in 17 years agricultural produce had suffered damage from hail to the extent of £26,331,754, or, on an average, £1,560,000 a year. M. Du Boucheron is willing, however, to admit that this estimate may be too high, and sets it down at £1,200,000 per annum.

† A law, passed 19 vendemiaire, an. VI., decreed, that indemnity should be granted for damage caused to property by intemperate seasons, by the elements, by contagious diseases amongst cattle, &c., and by such fires as did not arise from negligence. The fund applicable for these purposes in the year VI. was voted to be £600,000.

For several years past, the relief accorded to agriculturists has not amounted to more than £80,000 per annum, half of which is allotted to the Minister of Agriculture and Commerce, and the other half to the Minister of Finance. This sum allows of from 2 to 3 per cent. for damage caused by hail, drought, or inundations; and 5 or 6 per cent. to losses by fire, or epidemic diseases of cattle. A decree of the President of the Republic, dated 27 August, 1851, raises to 7½ per cent., as a special allowance, the proportion of relief to actual losses caused by the devastations of the weather on 20th July, 1851. This is all that the State could grant, even on the most extraordinary occasion.

the slight attention which has hitherto been given to the statistical inquiries respecting the duration of human life. In England, all the documents which could throw light on the probabilities of living at different ages have been analyzed with the greatest care, and the investigation has been extended not merely to the population in general, but to the different classes of which it is composed. Thus, whilst some *actuaries* prosecuted their inquiries into the law of mortality in England by means of the national registrations of deaths, which for many years past have been by special order of Parliament collected in a central office, other *actuaries* devoted their attention to the Tontines, Assurance Companies, and Friendly Societies. The organization in one *Institute* of the actuaries attached to the different Societies and Assurance Companies of Great Britain and Ireland, has given an impulse and interest to these studies which is continually increasing.

There is great need in France to acquire experience in all that concerns the probabilities of the happening of events to which the life of man is exposed. We still continue to employ, as if they deserved no verification, the Tables of Mortality of Duvillard and Deparcieux, which were formed at the end of the last century, under special circumstances. Even up to the present time there has been no table formed showing the number of days of sickness to which certain classes of the population are exposed, although the utility of such a table could be easily demonstrated, and its use has for many years been common in England.

This want is just supplied by an important work, recently published by one of our contributors, M. G. Hubbard, under the title *De l'organisation des Sociétés de prevoyance, et des bases scientifiques sur lesquelles elles doivent être établies.*

The author, from 44,069 observations, collected from the registers of the Mutual Benefit Societies of France, has prepared the first table of sickness which has yet appeared in France, at the same time that he has ascertained the law of mortality which prevails amongst the classes of whom these Societies are composed. The following is the mean duration of life resulting from these observations :—

MEAN DURATION OF LIFE.

Age.	French Table.	England.	
	Benefit Societies.	Neison.	Experience of 17 Life Assurance Companies.
25	39·19	40·21	37·98
30	35·69	36·61	34·43
35	32·22	32·97	30·87
40	28·44	29·33	27·28
45	24·56	25·72	23·69
50	21·29	22·19	20·18
55	17·87	18·85	16·87
60	14·30	15·69	13·77
65	11·12	12·74	10·97
70	8·59	10·21	8·54
75	6·50	8·27	6·48
80	4·69	6·50	4·78
85	3·21	4·99	3·36
90	1·77	3·18	2·11

After the age of 75, the table of M. Hubbard corresponds exactly with that of Deparcieux; from the ages 60 to 65, it shows a mean duration of life rather shorter; but at all the other ages it is longer. The principal difference is at the age of 25, and amounts to 2·02 years.*

"In comparing this Table of Mortality with all the others in use, both in France and England, it is found to correspond much more nearly with the Carlisle and Deparcieux's than with Duvillard's and the Northampton. We may hence draw the conclusion, that the observations which in the 18th century were considered to be applicable exclusively to the part of the population in more easy circumstances, may henceforth be extended to the working classes, of whom these Benefit Societies are principally composed. But we are not authorized to suppose that they represent the mortality in the general mass of the population; first, because these Societies exclude those classes who suffer from the extreme of poverty, of the mortality amongst whom MM. Villermé and Benoiston de Chateauneuf have given so terrible a picture; and also, because the observations do not extend to childhood and extreme old age—the two periods of life in which generations of continued toil produce the greatest effect on the average duration of existence.

"The table deduced from the registers of the French Benefit Societies presents the strongest analogy with Mr. Neison's observations for similar Societies in England. It shows a mortality of a much smaller degree of intensity than the table deduced from the observations of the English Assurance Companies."

We recommend to all Life Assurance Companies the work of M. Hubbard. It contains researches of the utmost importance to them, as relating not to the population in general, but to that class the most nearly approaching to the one with which they have to deal. The eminent men who formed the committee, and amongst whom we may enumerate its respected president, M. Languinais, MM. Bartholony, Delessert (François), Dufaure Ad d'Eichthal, De Watteville, and Olinde Rodrigues, are a guarantee more than sufficient of the earnest spirit in which the work has been commenced and judiciously accomplished.—*L'Industrie*, 11 *September*, 1852.

GERMANY.—*Lubeck.—Deutsche Lebens Versicherungs Gesellschaft in Lubeck* (*established* 1828).—*Balance Sheet*, 31*st December*, 1851.

Debtor.	£	*Creditor.*	£
To proprietors on account, 425 shares at £162 . .	68,850	By capital, 425 shares at £180	76,500
„ money invested . .	99,335	„ account of life insurance .	61,780
„ house of the Society .	600	„ ditto endowment insurance	3,361
„ interest due Dec. 1851 .	280	„ ditto annuities . .	17,061
„ cash	620	„ ditto deferred annuities .	1,534
„ money due to the Society	4,194	„ reserve for claims . .	1,800
		„ dividend account balance	32
		„ dividends unpaid . .	4,377
		„ money due by the Society	7,434
	£173,879		£173,879

* We have added the two columns containing the mean duration of life, by Neison, and the experience of the 17 English Life Assurance Companies, for the purpose of comparison.—ED. *A. M.*

Particulars of the Balance-sheet for 1851.

						£
Capital, 425 shares at £180						76,500
Life Insurance.						
Risk at end of December, 1850:—		£			Premium.	
Assurances for whole life		411,893				
" for terms of years		25,746				
					£	
		£437,639			55,801	
Income, 1851		..			15,997	
New policies—for whole life	£63,112					
" for terms of years	6,623					
		69,735			2,124	
		£507,374				
Cancelled—By death, 44 policies	£10,288					
Surrendered, 74 policies	11,166					
At end and elapsed	25,093					
		46,547				
Risks, 31st December, 1851:—						
For whole life	435,807					
For terms of years	25,020					
		460,827				
Interest		..			2,468	
Gain by agio		..			95	
Account of unsettled claims		..			117	
					76,602	
Paid 44 deaths		10,289				
" 74 policies surrendered		1,514				
" agents' provision		894				
" expenses of administration	£391					
" " office	354					
" " print, postage, &c.	1,380					
		2,125			14,822	
Life insurance balance						61,780
Endowment Insurance.						
Insured sum, December, 1850	£8,187					
Balance of premium					4,414	
Income of premium					153	
New insurances	554				70	
Interest					151	
	8,741				4,788	
Cancelled by death	£66					
Paid	1,423					
	1,489	1,423				
Insured sum, 31st December, 1851	7,252					
Agents' provision		4			1,427	
Balance of endowment insurance						3,361
Annuities.						
Balance, 31st December, 1850					15,196	
Premium paid for £302 yearly annuity					2,815	
" paid for £152 "					149	
Ditto ditto ditto					116	
Interest					463	
					18,739	
Annuities paid		£1,621				
Agents' provision		57			1,678	
Balance of annuities						17,061
Carried forward						£158,702

			£
Brought forward			158,702
Deferred Annuities.		Premium. £	
Balance, 31st December, 1850		1,521	
Premium paid		69	
Interest		45	
		1,635	
Paid annuities	£97		
Agents' provision	4		
		101	
Balance of deferred annuities			1,534
Reserved for unsettled claims:—		£	
Balance, 31st December, 1850		2,580	
Paid		780	
			1,800
Dividend account			32
Dividends unpaid:—		£	
Balance, 31st December, 1850		5,968	
Paid		1,591	
			4,377
Creditor			7,434
			£173,879

Gotha Life Assurance Bank (Lebensversicherungsbank für Deutschland in Gotha).—Position of the Company on 1st May, 1852.

Lives assured, 17,200 persons.	£
Sums assured	3,886,000
Reserve for policies in force	688,810
Guarantee fund	150,264
Total funds	940,857
Amount of investments bearing interest	910,000

Since the opening of the Bank, from the 1st January, 1829, there were assured altogether—

Lives assured	24,463
Total sums assured	£5,798,329
Number of deaths	3,679
Amount of assurances thereby payable	£878,939
Amount of dividends paid	£301,278

Dividends for 1852, to policies in force from 1847.....23 per cent.
Ditto for 1853 „ „ 1848.....24 per cent.

Potsdam.—Cattle Insurance.—In the third edition of the statutes of the Potsdam Cattle Insurance Company, it appeared that the operations of the Company were extended over the whole of the Prussian States; and by the revised fourth and fifth editions, still further into the neighbouring dukedoms and principalities. The extension of a Cattle Insurance Company to the whole of Germany has already occurred several times; and the rapid progress of the business has shown how easily the Company could accomplish its end. They have profited considerably by the information and experience of Herr Masius in the formation of the earlier Leipzig Cattle Insurance Company for Germany. We may consider it a happy circumstance when a Company proceeds on sure and systematic grounds, with foresight, prudence, and honourable regard for engagements, and when the control and management of the business is in accordance with strict adherence to rules, love of justice, and humanity.

The Potsdam Cattle Insurance Company numbers, in the Prussian States, 1,554 members. The Company has insured 1,697 heads of cattle—1,292 horses, and 668 swine and goats—for a total sum of £21,663; whilst in November of last year there were only 800 members, and an amount of

£10,714 insured. It is evident therefore that the Company has made a good commencement, and is likely to proceed rapidly, and the members are called upon to use every exertion to extend its influence.

Trieste.—Note on the early History of Life Assurance, by Leopold Adles.—That the contract for marine insurance had its origin in Italy, is a fact of which there is no longer any doubt. It seems to me, from a passage in the autobiography of the celebrated Benvenuto Cellini, that the life assurance contract also was known in Italy much earlier than in England. In the year 1552, Benvenuto Cellini travelled to Rome to arrange some business with his banker, Bindo Altoviti. This merchant was rich and (as it was usual at that time for men in his position to be) learned, and a protector of the arts and sciences; but he was also no stranger to the political intrigues of that troublous period, and was therefore a little straitened in circumstances, and instead of paying Cellini 1,200 gold thalers ("Scudi d'ori in oro"), give him evasive replies. They came at last to an agreement, that Bindo Altoviti should give Cellini 15 per cent. during his life, as a life annuity, in lieu of his money ("e ci convenimmo che quei mia danari è gli tenesse a quindici percenta a vita mia durante naturale").

Cellini, in his life, mentions other similar contracts, and from the manner in which he speaks of them, it seems that these transactions were not new, but long known, and of common occurrence. We may thence conclude that the life assurance contract was known in Italy in the sixteenth and perhaps early in the fifteenth century.

That Italy should be the cradle of such a business is the more reasonable to suppose, because the Italian, Tontini, first introduced into France his system, known by the name of Tontines, even before a life assurance institution had been founded in England.

The credit of having established life assurance upon a sure basis belongs incontestably to England. It is remarkable that so high a rate of annuity as is now paid to a person 70 years of age was then offered to Cellini in his 52nd year. This arises partly from the ignorance of the average duration of life, but partly also from the high rate of interest which at that time was prevalent in Italy. This would be naturally attributable to the long wars, which unsettled commerce, and to the extravagance of the new princes, who vied with each other in their lavish expenditure.—*Masius-Rundschau der Versicherungen, September.*

Vienna.—The *Mittheilungen aus dem Gebiete der Statistik* gives some interesting accounts of the successful operations of the Proprietary and Mutual Insurance Companies in the Austrian Imperial States, to the most recent date. According to these statements, the amount on which the Proprietary Companies agreed to make good the losses in 1850 was £71,570,352, and that of the Mutual Fire Insurance Companies £21,504,802; together, £93,075,154. For losses, repairs, and compensations, the Proprietary Companies paid, in the year 1850, £103,417, = ·144 per cent.; and the Mutual Companies £70,441, = ·327 per cent.; amounting together to £173,858, = ·187 per cent. As far as regards the seven Mutual Fire Insurance Companies, the insurance premiums in the year 1850 amounted, in Lower Austria, to ·366 per cent.; in Upper Austria, ·15 per cent.; in Steirmark, Carinthia, and Krain, ·25 per cent.; in Tyrol, ·3 per cent.; in Bohemia, Moravia, and Silesia, ·48 per cent.—*Rundschau der Versicherungen.*

REPORTS OF ASSURANCE COMPANIES.

Accidental Death Insurance Company.—First Annual Meeting, May, 1851.—The report stated that the premiums received during the first twelve-months amounted to £1,228. The directors, in accordance with the deed of settlement, had enlarged the operations of the Company from insuring only against fatal injuries to granting compensation in non-fatal cases. Tables of rates had to be prepared, and other arrangements made, and it was only in November last that they were enabled to enter on the new business. In December the receipts were 8 times, and in January 11 times, the amount received in November, the last month under the old system.

Ægis Assurance Company.—March, 1852—*Third Annual Meeting.* —The balance-sheet showed that there had been an increase in the premiums of the past year of one-half beyond those of 1850. The increase in the fire department has been to an extent nearly double. The capital account has increased more than £10,000, proving a guarantee to the assured of £83,557. 10*s.* A dividend of 5 per cent. on the paid-up capital was agreed to.

Agriculturists' Cattle Insurance Company, December, 1851.—In the *Post Magazine* it is stated that the Company was established in the year 1845. The shares were well subscribed for, and a large amount of business being transacted, they soon rose to a premium. But it afterwards appeared that the real position was not so flourishing; and when a new direction came in, in 1848, Mr. Riley, the actuary, was consulted, when it was found that the outstanding liabilities were upwards of £2,000,000, and the debts actually owing at that period above £75,000. This state of affairs appearing to arise from too low a rate of premium, it was deemed advisable to increase the rates from an average of 2½ to 3½ per cent., and to reduce the allowance on losses from three-fourths to two-thirds. The total liabilities were thus reduced below £12,000, and the business placed in a prosperous condition. For 5 months, ending in November, the amount insured was £59,426, the estimated loss being £156, and the actual loss only £138. During October and November the sums assured amounted to £35,853.

The report stated that 120 new agencies had been established in England and Scotland, and that the amalgamation of two important Mutual Cattle Insurance Companies in Essex and Lancashire had been effected. The directors have resumed the assurance of human life, and added the insurance of crops against hail-storms to the other departments of the business. They recommend the meeting to authorize the issue of 25,000 of the unappropriated shares as preference shares, upon which interest at the rate of 5 per cent. per annum shall be paid half-yearly, the said shares to be issued on payment of a deposit of 17*s.* 6*d.* per share.

[As this branch of insurance can only be considered as recently established, we append the following summary of statements made at a meeting held at Lincoln in June, 1851, to show the mode in which the premiums are charged and compensation granted.—Ed. *A. M.*]

"The Agriculturists' Cattle Insurance Company, which was introduced to the meeting, has hitherto been little known in this neighbourhood, although in Scotland and other parts of the kingdom it has for some time past done a very large business. It has been in existence for six years, and possesses a capital of £500,000, the Company being proprietary, consisting of 100,000 shares. The necessity of the existence of a Company for the insurance of cattle was clearly demonstrated by the fact that this Company has, during the six years it has been in existence, paid nearly £300,000 in compensation for losses. In order to extend the usefulness of the Company, and to afford unquestionable security to the insured, a larger amount of additional capital has lately been contributed, the rates of premium have been revised, and, in consideration of the depressed state of the agricultural interests, conditions of a most liberal kind have been determined upon.

"The rates of insurance were stated by Mr. Lea, the speaker, to be as follows:—Cattle: dairy cows, 7½*d.* in the pound; feeding stock, 6*d.* in the pound; young stock under one year old, 1*s.*, and above one year old, 7½*d.* in the pound; bulls not exceeding £20, 1*s.* in the pound; not exceeding £40, 1*s.* 3*d.* in the pound, &c. In order to provide a more equitable compensation for losses amongst agricultural dairy cows in the several periods of the year, when they are usually at materially different values, the directors have decided to divide the year into two equal portions, the first extending from the 1st of January to the 30th of June, and the second from the 30th June to the 31st December. In the first half-year, when dairy cows are usually of least value, the compensation allowed will be two-thirds of the salvage, and in the second half-year the allowance will be four-fifths of the insured value, and one-fifth of the salvage. On losses among young stock, compensation will be uniformly made to the extent of two-thirds of the insured value, and one-third of the salvage. On losses among feeding cattle, three-fourths of the insured value, and one-fourth of the salvage, will be allowed.—Horses: agricultural horses not exceeding £30 value, 7½*d.*, and exceeding £30, 9*d.* in the pound; carriage-horses, hacks, and breeding mares, not exceeding £30, 9*d.*; and exceeding £30, 1*s.* in the pound; race-horses, hunters, and entire horses, 2*s.* in the pound and upwards, according to value and apparent risks. On losses among horses, two-thirds of the insured value will be paid, subject to a deduction of £1 on each animal as for salvage.—Sheep: in this department, Mr. Lea remarked that it had been decided to charge a uniform rate of 1*s.* 6*d.* in the pound on breeding sheep, and 1*s.* in the pound on feeding sheep; that rate he (Mr. Lea) believed was as low a scale as could safely be adopted on many lands, where the risk was so great. He, however, without wishing at all to flatter the gentlemen before him, must say, that in most parts of Lincolnshire the sheep were superior to most that he had seen, and he had in the course of his travels over the country made many inquiries, the result of which had been that he had determined on recommending a lower rate of insurance for sheep in this particular district; he had, therefore, been to town, and, after a conference with his colleagues, it was determined to reduce the rates of insurance on sheep for Lincolnshire to 1*s.* in the pound on breeding sheep, and 9*d.* in the pound on feeding sheep; on rams, 1*s.* 6*d.*, and prize rams, 2*s.* and upwards in the pound."

Albion Life Insurance Company.—Statement of the Capital, Assets, Liabilities, &c. of the Albion Insurance Company, of London and New

York, on the 29th day of September, 1850, *being the close of the* 45*th year of the Company's existence:*

Capital Account.	No.	Amount. £	Called. £.	s.	d.
Shares originally issued	1,832	916,000	91,600	0	0
Shares subsequently purchased, in accordance with the provisions of the deed of settlement, and transferred into the names of the Co.'s Trustees	998	499,000	49,900	0	0
Shares held by proprietors on Sept. 29, 1850	834	417,000	41,700	0	0
Accumulated profits to Sept. 29, 1850			39,557	13	6
Aggregate value of outstanding shares on the 29th day of Sept., 1850, as certified by the auditors, under date 18th October, 1850			£81,257	13	6

From this it will be seen that the certified value of the Company's shares, on the 29th day of September, 1850, was nearly 95 per cent. above par.

Assets.	£.	s.	d.
Mortgages, bonds, and debentures	263,571	13	0
British Government Securities: namely, Exchequer Bills, 3¼ per cent. Reduced Annuities, and Long Annuities	72,046	2	0
United States Stock of 1856 and 1867, 118,300 dols.	26,819	8	9
Stock of the Bank of England	43,050	0	0
Stock of the Katherine's Dock Company	5,740	0	0
Freehold of the Company's house, and leaseholds in London and its vicinity	8,750	0	0
Agents' balances	4,722	15	1
Interest, rents, annuities, and premium, due to the 29th Sept., 1850, but not received at the time of closing the Company's books	15,161	1	2
Cash at Bank of England	11,124	18	11
Petty cash in hand	33	9	9
Stamps in hand	39	10	0
Office furniture	300	0	0
Premium notes held by the Company	(none)		
	£451,358	18	8

Liabilities.				£.	s.	d.
Reserved fund in respect to 1,512 policies insuring £1,443,505, including 343 policies insuring £296,926 (1,484,630 dols.), issued or continued through the Company's agent in New York				331,159	7	9
Reserved fund in respect to 8 annuities granted by the Company, amounting to £1,770				19,493	0	0
				£350,652	7	9
Reserved fund to provide for possible depreciation in value of the Company's securities				10,017	10	5
Claims under policies in course of settlement	£7,387	0	0			
Unclaimed dividends due to proprietors	210	18	2			
Sundry outstanding debts	1,818	5	8			
Interest received in advance	15	3	2			
				9,431	7	0
				£370,101	5	2

Receipts.	£.	s.	d.
Amount received for premiums during the year ending 29th September, 1850, including £10,305. 14s., the premiums received in New York	48,578	3	2
Interest, rents, and annuities	19,621	14	0
Decrease in the estimated value of the Company's liabilities, consequent upon the cancelment of policies by death, expiration, &c., and the increased age of certain annuities	1,719	7	0
	£69,919	4	2

Expenditures.	£.	s.	d.
Amount of claims arising from death during the year, including the sum of £2,291. 13*s.* 4*d.*, arising from three policies issued in New York	29,139	13	3
Amount paid for surrender of policy and bonus	5,628	13	7
Amount of annuities paid during the year	1,725	0	0
Amount carried to the reserved fund to provide for possible depreciation in value of the Company's securities	3,078	3	8
Amount paid Symes, Weston, & Co.	1,045	10	10
Amount carried to credit outstanding debts, to provide for various expenses, the account of which had not been rendered at the time of closing the Company's books	1,000	0	0
Commission and other agency charges	2,328	0	0
Directors' and officers' salaries, auditors' and medical fees, and sundry office and incidental expenses	2,398	7	3
Advertisements, printing, postage, &c.	814	6	6
Rent and taxes (including income-tax, and repairs of the Company's house)	1,074	17	6
Sundry gratuities	251	18	6
Loss on exchange	6	5	0
	£49,010	16	6

Last dividend to proprietors, declared October, 1850, at 7 per cent., and paid out of the accumulated profits before specified (see capital account)	2,919	0	0
Last dividend or bonus to policy-holders, declared September, 1849, as to 30th April, 1849, at 20 per cent.	6,722	5	10
Corresponding reversionary bonus	13,654	4	2
Total claims arising from death, paid from the establishment of the Company in 1805 to 29th September, 1850	1,518,624	0	0
The entire expenses of management (including commission) borne by the policy-holders, for the year ending 29th September, 1850, was only	2,940	2	8

Alfred Life Assurance Association.—The Annual General Meeting (being the second quinquennial one), held July, 1851.—It was stated that, during the last year, the new premiums had added £3,000 to their income. Their losses had been moderate, having amounted to only £8,000. The former report comprehended a period of seven years—from 1839 to 1846. The present one embraces a term of five years only—viz., from 1846 to 1851. It appears that, up to the 30th of June last, the Company had issued 1,135 policies of various kinds, assuring the sum of £995,580 (near one million sterling); that 54 annuities had been granted, securing to the grantees, in the aggregate, £4,051. 12*s.* 9*d.* per annum; and that 132 reassurances have been effected, for the sum of £123,750.

Of the lives assured, out of the 1,135 only 61 have dropped, entailing claims of not more than £38,559; whilst, amongst the 54 annuitants, not less than 16 have died, and a total annual payment of £1,343. 12*s.* has in consequence reverted to the Company.

Liabilities.

	£.	s.	d.
Value of sums assured and bonuses	306,457	12	0
Paid capital fund	17,100	0	0
Surplus fund	56,692	2	9
Interest due	395	10	0
Claim admitted	500	0	0
Bankers	8,500	0	0
Sundries	1,412	3	9
	£391,057	8	6

Assets.

	£.	s.	d.
Value of premiums	267,581	13	0
Government Securities	42,125	18	5
Mortgages	49,417	4	0
Reversions	14,043	19	6
House in Lothbury	13,800	0	0
Balance at Bankers	2,805	12	4
Premiums due	1,118	7	9
Sundries	164	13	6
	£391,057	8	6

From this document it appears that the total assets of the Company are £391,057. 8*s.* 6*d.*, and that, after making ample provision for the fulfilment of the Company's various engagements, for the proprietors' capital, and other less important items, a clear surplus remains of £56,692. 2*s.* 9*d.* available for present and future bonuses, expenses, and other extra contingencies. This will admit of a bonus on the paid-up capital of 16 per cent., or 15*s.* on each £5 share, and the due proportion to be appropriated to the assured will enable the directors again to make considerable additions to the sums assured under their policies, as the following specimens will show:—

Date of Assurance.	Duration of Assurance.	Sum originally assured.	Addition in 1851.			Total Sum assured, including previous Bonus.			Percentage of additions on Premiums paid.
	Years.	£.	£.	s.	d.	£.	s.	d.	
June, 1839	12	5,000	335	19	8	5,908	8	6	52
" "	12	2,000	153	1	7	2,390	10	11	64
" "	12	500	34	3	0	593	3	0	52
July, 1839	12	900	68	1	0	1,073	10	7	67
Aug., 1839	12	5,000	384	0	6	5,937	1	1	65
" "	12	5,000	253	4	0	5,819	17	10	29

The bonuses given now and on a former occasion constitute together an addition to the amount originally assured, equal, in many instances, to no less than 67 per cent. on the premiums paid.

The question of converting the Company into a mutual one was urged by some of the members; and the chairman assured the meeting that the subject was one which had had the mature consideration of the directors. A committee of the board of directors was formed, and they were assisted by Mr. Jellicoe, and after great consideration they decided that, at the present moment, it was not desirable to become a Mutual Office. One gentleman appeared to think that 50 per cent. should be the amount of bonus, whilst others thought it should be 100 per cent.; and it was under these circumstances that the directors thought it was not right to make a proposition. They were anxious that this should become a Mutual Assurance Society, but they did not think that the time had arrived to adopt that principle.

Colonel Tulloch said there was a large portion of the surplus fund which was absolutely the property of the shareholders. The proportion of deaths was amazingly low, when they considered that the country had been visited by cholera, influenza, typhus, and famine. The medical reports showed the mortality during the last two or three years (and he had under

his charge 85,000 pensioners) to have been one-tenth higher than under ordinary circumstances. The business which had been done by this Society showed how carefully the selection of lives must have been made. If this became a Mutual Office now, they might find that, though their business would be increased, the profits would by no means correspond with that increase.

A member suggested that, as there was a difficulty in respect to the compensation to be given to the shareholders for the transition from one state to another, a committee should be appointed, to be elected by the proprietors, who should be associated with the board of directors, and that these gentlemen, after investigating the subject, should come prepared to report to the proprietors the plan on which this arrangement should be carried out.

The chairman expressed his readiness, and that of his brother directors, to entertain such a proposition.

After a few words from Mr. Paris and Mr. Jellicoe, the chairman put the question—that the report be received and adopted, which was carried unanimously.

A long discussion ensued, in the course of which Mr. Sadler proposed the appointment of a committee of shareholders, to act in concert with a committee of directors; and that motion was carried.

Messrs. Gay, Moore, Higley, and James, were then nominated and appointed as the committee.

Alfred Life Assurance Association.—The Annual General Meeting, held July, 1852.—The honourable chairman, after alluding to the steady increase of the Company, said that, on looking over the accounts, he found that though their premiums were somewhat higher than that of other offices, yet that was attended with some beneficial results—he alluded to the bonus, which was a quinquennial one. The expense of the office was on a low scale; for while the expense of other offices of much less pretension exceeded £6,000 a year, theirs did not much exceed £2,000. Before moving that the report be read, he wished to notice a point which had been the cause of much anxiety to the directors—he alluded to the suggestions which had been made to convert the Association into a Mutual Company. On the 16th of August, 1851, four members were appointed to confer on this point with the committee named at the general meeting. On the 20th of August Mr. Maunsell, one of the members so appointed, reported that, at a meeting of the committee, appointed by the last annual general meeting to confer with the directors as to the expediency of taking measures to make the Alfred Assurance Company a Mutual Office, it was unanimously resolved—"That, without deciding whether the mutual or proprietary system is the more desirable, this committee, after conferring with the directors, is of opinion that the present is not a desirable time for considering that question, so far as the Alfred Office is concerned." The question was again brought before the same committee on the 25th February, 1852, and the committee again resolved—"That they were not prepared at present to give any further opinion on the subject of the mutual and proprietary principle, so far as the Alfred Office was concerned, beyond what they had already expressed in their resolution of the 20th August, 1851." Even, therefore, if such a change were practicable, it was evident that it would not be made this year. The question, whether such a change would

be beneficial, could only be discussed after the question of its practicability had been settled; and they must be guided, in a great measure, by the experience of other offices in deciding it.

"The report stated that, on the last occasion, it appeared that the Society had assurances in force for £539,438, yielding an annual income of £18,656. These have been increased during the year to £611,097, and paying premiums amounting to £22,173. 18*s.* 11*d.* From this total, however, the assurances lapsed during the year by death and other causes have, of course, to be deducted.

"The number of policies lapsed by death is 15, and the amount payable in respect of them is £9,451. 2*s.* 8*d.*, including the additions made by way of bonus to the sum assured.

"The directors have had frequent occasions to remark on the very low rate of mortality observable among the lives assured with the Association, and the experience of the past year warrants their again congratulating the members on that head.

"The office expenditure still maintains its very moderate character, the amount for the past year being no more than £2,657. 17*s.* 4*d.*

"After payment of the claims, and all other outgoings, the sum of £6,109. 3*s.* 2*d.* has been carried to the credit of the surplus fund, which now amounts, as will be seen, to £62,801. 5*s.* 11*d.*

"The account of assets and liabilities, as at the 30th June, will thus be as follows:—

Liabilities.

Dr.	£.	*s.*	*d.*
Value of sums assured and bonus	306,457	12	0
Paid-up capital	19,650	0	0
Surplus fund	62,801	5	11
Claims admitted	3,719	8	0
Interest due to proprietors	416	2	6
Sundries	1,459	17	1
	£394,504	5	6

Assets.

Cr.	£.	*s.*	*d.*
Value of premiums	267,581	13	0
Government Securities	35,882	13	11
Mortgages	53,263	6	6
Reversions	16,080	2	6
House in Lothbury	13,400	0	0
Balance at bankers	3,232	2	2
Premiums due	1,784	15	7
Shares purchased	2,745	0	0
Sundries	534	11	10
	£394,504	5	6

Anchor Assurance Company, for Fire, Life, and Annuities.—Annual General Meeting, held 6th May, 1852.—The report stated, that antecedently to the close of 1849 the transactions of the Company were confined to granting assurances upon lives, effected principally within the limits of the metropolis. It was then determined to add the fire insurance branch, and to extend the operations to all parts of the country. Six hundred agents were appointed, and local boards established in Manchester, Glasgow, and Hull. The business has also been extended by agents in

Liverpool, Edinburgh, Hamburgh, and in most of the principal towns in Ireland. In eighteen months since the establishment of the fire department 3,800 policies have been issued, insuring nearly £2,250,000, producing in premiums £7,109. Up to the end of the last financial year the losses by fire amounted only to 16 per cent. of the premiums received.

The business of the life department, dating from 1842, has increased in the last two years in a threefold ratio, as compared with the year immediately preceding. The mortality has been at the rate of only two-thirds of what, according to the table, ought in the period to have occurred. With regard to advances of money to policy-holders on personal security, the directors have been disposed, from the many drawbacks and inconveniences attending them, to restrict the investments of this kind, and which have therefore been increased within the last two years by a sum of only £8,000.

Within the last year the Company's Life Tables have been revised by the actuary.

In reply to questions, it was stated that the number of policies for the whole term of life issued last year was 351, producing an income of £8,300.

Athenæum Life Assurance Company. — First Annual Meeting, August, 1852.

Balance-sheet, from the 30*th June,* 1851, *to* 30*th June,* 1852.

Receipts.	£.	s.	d.	*Payments.*	£.	s.	d.
Capital and deposits	18,515	3	2	Preliminary expenses	2,585	16	7
Premiums	4,419	5	2	Furniture	512	9	7
Commissions	33	5	7	Advertisements	241	4	6
Loans repaid	66	6	8	Life commission	450	15	11
Profit and loss	18	0	7	General expenses, wages, coals, house, and travelling expenses	452	6	7
				Rent and taxes	377	19	0
				Salaries and agency expenses	1,041	11	10
				Profit and loss	73	3	3
				Directors' fees	293	4	6
				Printing and stationery	133	11	2
				Medical fees	260	12	3
					£6,422	15	2
				Cross assurance	392	15	9
				Deposit returned	2,264	13	7
				Invested in securities	5,020	0	0
				Balance at bankers, &c.:—			
				At bankers £8,056 3 8			
				In manager's hands . 189 12 0			
				In agents' hands . . 706 1 0			
					8,951	16	8
	£23,052	1	2		£23,052	1	2

During the first year (or rather nine months of active operation) 322 policies have been issued, yielding £4,419. 5*s.* 2*d.* in premiums. The total number of proposals have been 413. No claim has occurred. The directors recommend a dividend of 5 per cent (exclusive of income tax) on the paid-up capital.

British Commercial Life Insurance Company.—Annual Meeting, held May, 1851.—The report for the year 1850 stated that 371 new policies were issued, and the premiums on them were £6,592.

The sum assured upon policies claimed by deaths in 1850 was £31,893, and the premiums received upon them amounted to £30,655.

The profit by lapsed policies during the same period was £13,600, and the sum paid for such as were cancelled by purchase was £4,172. 10*s.* 3*d.*, and the liabilities extinguished exceeded £78,600.

Assets of the Company, invested in Government stock and other securities, £249,711. 6*s.* 8*d.*

Subscribed capital uncalled, £510,000 (paid up, £90,000).

British Empire Mutual Fire Insurance Society.—Annual Meeting, held 28th August, 1851.—*Third Annual Report.*—In the three years, 358 agents have been appointed, 4,692 policies for £1,894,580 have been issued, and care has been taken to avoid risks of peculiarly hazardous character. The premiums received have been as follows:—

				Duty paid to Government.		
	£.	s.	d.	£.	s.	d.
First year . . .	988	14	8	863	18	8
Second year . . .	1,554	13	2	1,491	2	0
Third year . . .	2,407	9	4	2,289	14	11
Total . .	£4,950	17	2	£4,644	15	7

The total losses paid in the three years amount to £1451. 18*s.* 10*d.*, or £29. 6*s.* 7*d.* per cent. on the premiums received, not including two subsequent losses which have occurred, but not been paid, in the year. The surplus, £3,498. 18*s.* 4*d.*, is left to meet expenses and yield profits. The directors have decided to spread the early expenses over 18 years, and announce a return of 12½ per cent., besides carrying an equal amount to the reserved fund. The return is confined, according to the deed of settlement, to policies three years in force.

British Empire Mutual Fire Insurance Society.—The Fourth Annual Meeting, August, 1852.—The report gave the following statement of the business done to 30th June last:—

New Policies issued.					
	No.	Amount assured.	Receipts on ditto.		
		£	£.	s.	d.
1st Year.....	1557	659,080	2,083	19	5
2nd „	1273	504,431	3,159	17	0
3rd „	1862	731,069	4,870	2	9
4th „	2074	829,540	6,589	18	5
In 4 Years..	6766	£2,724,120	£16,703	17	7

Of this amount, £8,258. 3*s.* 7*d.* were premiums, and £8,445. 14*s.* duty.

Average new business per year, £681,030.

The total losses sustained during four years have amounted to £3,734. 15*s.* 8*d.*, being 45½ per cent. of the premiums received.

Steps have been taken by the directors to endeavour to remove inadvertent and unjust governmental impositions upon fire insurers.

The cash account was as follows:—

Receipts.	£.	s.	d.	*Expenditure.*	£.	s.	d.
Balance from last year	1,541	5	9	Working expenses	1,880	14	2
Guarantee and loan account	2,297	17	10	Duty and stamps	3,156	15	11
Premiums net	2,895	5	2	Losses	2,397	3	6
Duty	3,312	0	6	Reinsurance	255	3	10
				Interest	235	1	7
				Balance at bankers, &c.	2,121	10	3
	£10,046	9	3		£10,046	9	3

It was stated that the losses in the four years had been paid in sums varying from 1*s.* to £800 or £900. The Society had confined themselves to risks where the premiums did not exceed 10*s.* per cent., and in the first instance limited their policies to £1,000, but had recently extended them to £1,500.

British Empire Mutual Life Assurance Company.—Fourth Annual Meeting, held 25*th Feb.*, 1851.—The chairman stated, in the course of his opening remarks, that in the first year there had been 257 life policies issued; in the second, 311; in the third, 708; and in the last, 809. In the amount assured, the addition to their former business was £150,000 in the year. The report stated that the premiums received on life business during the three years ending December 31st, 1849, amounted to £10,040. 17*s.* 2*d.*; whilst in the single year 1850, the sum of £10,380. 15*s.* 5*d.* was received from that source. The advances granted in 1850 on approved securities were £10,594. 6*s.*

While the premiums have been doubled, the claims for deaths in 1850 have been half of those for 1849, and only one-fifth of those provided for by the tables. The total claims for death under policies in 1850 amounted to £495. 14*s.* 6*d.*, being less than 6 per cent. on the premiums received. This, added to amounts previously reported, makes £1,586. 18*s.* 11*d.* from the formation of the Company.

The statistics for the year 1850 stand thus:—

	New Policies issued.									Total Premiums received in the Year.		
	No.	Amount Assured.			Yearly.							
		£.	s.	d.	£.	s.	d.	£.	s.	d.		
Life.....	809	136,365	6	0				10,380	15	5		
Investments...	410	28,014	11	11				4,996	17	8		
Annuities* ..	14				202	16	5					
	1233	164,379	17	11	202	16	5	15,377	13	1		

* In the former reports, the life and annuity policies have been stated in one sum.

	Policies effected from the formation to this date.							Policies in force December 31, 1850.									
	No.	Amount Assured.			Yearly.			No.	Amount Assured.			Yearly.			Annual Income thereon.		
		£.	s.	d.	£.	s.	d.		£.	s.	d.	£.	s.	d.	£.	s.	d.
Life.....	2085	342,031	19	0				1871	311,238	9	0				9,838	11	3
Investment	1578	98,618	3	7				981	62,398	15	8				4,446	17	11
Annuities..	43	..	..		908	3	2	33	..	..		730	2	5			
Total....	3706	440,650	2	7	908	3	2	2885	373,637	4	8	730	2	5	14,285	9	2

Moneys on mortgage, &c. on this date, including balance at bankers and in agents' hands, £19,107. 8*s.* 7*d.*

British Empire Mutual Life Assurance Company.—Extraordinary Meeting, held Nov. 1851.—The chairman stated that the business of the Company was at present impeded, and its profits diminished, for the want of an Act of Incorporation, which the directors now proposed to apply for. At present the cost of the registration required every half-year by the Joint Stock Companies Act, 7 & 8 Vict., of the names and addresses of the members, was increasing every year. For the present year it would amount to £85, and the next would not be less than £100; and the registration was still very imperfect. Another difficulty was caused by their trust deed, as it bound them to set aside 50 per cent. of the profits for a certain period as a reserved fund. As the data on which their calculations were made were based on the Government Tables, there could not be a necessity for applying one-half of their profits as a reserved fund. It was proposed in the intended Act, that 10 per cent. only of the profits should be set aside for a certain number of years, and 5 per cent. for a subsequent period, till the reserved fund should reach a certain amount; also that the expense of obtaining the Act should not be paid out of the forthcoming, but out of the second, division of profits. After a motion, that the consideration of the subject should be deferred till the annual meeting, and the proposed Act printed and circulated amongst the members, had been negatived, the original resolution was unanimously agreed to, and the draft of the proposed Act of Parliament read and adopted.

British Empire Mutual Life Assurance Company.—Fifth Annual Meeting, Feb. 1852.—The report gave the following account of the business of the first five years:—

New Policies.					
	Number.	Sums assured in the Year.	Total Premiums received in the Year.		
		£.	£.	s.	d.
1847	257	49,998	1,435	16	4
1848	311	48,039	2,600	8	1
1849	706	107,629	5,474	2	5
1850	808	136,365	8,889	4	2
1851	1065	211,272	13,477	6	5
	3147	£553,303	£31,876	17	5

After the payment of all expenses and claims, the Company has accumulated the sum of £26,812. 2*s.* 8*d.*, the whole of which, with the exception of the balance in hand, is invested on approved securities.

The directors, having taken account of liabilities and assets, find that there is a disposable balance of £8,025. 1*s.* 7*d.* (stated to be about 44 per cent. on the amount of premiums actually paid), which they recommend should be declared as the amount of the divisible profits for the five years ending 31st December, 1851, one moiety of which, according to the deed, is to be set aside for a reserved fund, and the other moiety, proposed to be free of income tax, divided amongst the policies entitled to participate.

British Mutual Life Assurance Society.—General Annual Meeting, held June, 1851.—Report stated, that in 1848 the directors had granted nearly as many policies as had been effected during the preceding four years. The number of policies that have been issued is 1049, assuring £200,039. 19*s.*, at premiums amounting in the gross to £14,179. 10*s.* 8*d.* Besides these, 277 other proposals have been received, to assure £74,843. 3*s.* 6*d.* more, which have either been declined or not completed; 258 policies, assuring £53,181. 13*s.*, have become lapsed, upon which £2,173. 19*s.* 4*d.* had been received; and 11 policies have become claims by death, to the amount of £2,898. 19*s.*, upon which £330. 9*s.* 6*d.* had been received.

The amount of business existing on 25th March consists of 780 policies, assuring £143,959. 7*s.*, the annual premium receivable upon which is £3,822. 15*s.* 8*d.*; the average age of the lives assured is under 32½ years, the average of each policy being £183. 5*s.* 7½*d.*

Since the 25th March 52 policies have been issued, assuring £11,483. 16*s.*, upon the annual income of £512. 7*s.*, whilst three proposals to assure £400 have been declined, and there remain now, up to the date of this report, 22 proposals, to assure £4,698, under the consideration of the Board.

With regard to the loan and guarantee fund, the directors had suspended the issue of more shares, except to the new directors. The shareholders have duly received their interest, at the rate of 5 per cent. per annum. There is in existence a guarantee fund, which, independent of the assurance fund, would afford £12,000 to meet any pressure which may arise from future contingencies.

The loan classes, though unconnected with the Society, have been the means of bringing in a large amount of business, and provide means for the employment of the funds of the Society in aiding the class operations, by granting them loans at an interest which could not be procured from any other of the ordinary sources upon the like satisfactory security. Upwards of £30,000 must have been lent out by the classes established in London alone. Not one single bad debt has been made.

British Mutual Life Assurance Society.—From the Report, June, 1852.—During the past year, the business transacted has exceeded that of any previous year; 261 policies having been issued, assuring £44,108. 15*s.* upon lives averaging the age of 34 years, and securing an annual income in premiums of £1,224. 1*s.* 2*d.* Since the accounts were made up, 73 more policies have been issued, assuring £14,095. 10*s.*, making a gross total assured since the commencement of the Society of £258,244. 4*s.* Deducting the assurances which have lapsed and the claims which have been paid, the amount now assured is £185,451. 14*s.*, the annual premiums upon which amount to £5,087. 0*s.* 11*d.* In addition to these, there are now 27 proposals for assurances, amounting to £7,599, either accepted and not yet completed or under consideration. The deaths during the year have been 3, involving claims for £600. The claims paid up to the date of these accounts are £3,498. 19*s.*; whilst the amount received on these claims, and policies which have been allowed to lapse, is £3,887. 10*s.* 11*d.* Subsequently two more policies have become claims by one death, on which £1,000 is payable. The directors have continued to discourage the extension of the guarantee and loan fund department, and only 156 new

shares, with a view of accommodating three of the shareholders, have been issued with £1 deposit paid.

With regard to the Subscription Loan Assurance Classes, about 40 classes are now in full operation. Many thousand pounds have been lent, and only a very trifling amount of loss by bad debts has occurred.

General Statement of Accounts for the year ending 25th March, 1852.

Dr.

1851.—March 26th.	£.	s.	d.	£.	s.	d.
To cash balances, as per last report, viz.—						
At Messrs. Masterman and Co., bankers	379	8	7			
On hand	68	19	7			
In secretary's hands for policy stamps	24	17	6			
				473	5	8
Balance of loans and investments, as per last report				2426	1	1
Agencies accounts, for amounts received from agents, due at date of last report				217	9	0
Guarantee and Loan Fund Association, for deposits received on 156 shares issued during the year				156	0	0
Premiums, for received on £44,105. 15*s.*, new assurances granted	1078	2	8			
And for renewal of former assurances	3777	7	2			
				4855	9	10
Government duty, received for policy stamps				118	17	6
Interest, for interest on loans and investments				201	2	2
British Mutual Loan Classes, for balance on this year's account for expenses of formation, &c.				34	2	0
Sundry creditors, for new liabilities incurred during the year, consisting of interest on shares, not yet applied for, and money received at interest, &c.				266	14	6
				£8749	1	9

Cr.

By claims paid on policies, arising from death of three of the lives assured				600	0	0
Annuities paid				26	0	0
Policy stamps, paid for stamps on policies.	118	17	6			
In secretary's hands, to be accounted for	28	5	0			
				147	2	6
Surrender of policies, paid for the surrender of one policy				37	17	2
Sundry creditors, for paid them on account of balances due, amounting as per last report to £1,080. 4*s.* 9*d.*				369	11	3
Guarantee and Loan Fund Association, for interest on shares				231	3	6
Commission, for paid to agents and others				150	13	9
Medical fees, paid to medical officers and referees				163	15	3
Solicitors' bill, for deed of settlement, &c.				110	12	10
Expenses, for paid—						
On account of the house, 17, New Bridge Street—rent, taxes, furniture, &c.	316	2	11			
Advertisements	165	13	11			
Directors' attendance fees	446	5	0			
Salaries	538	10	0			
Miscellaneous, including printing, stationery, travelling, messenger's wages and livery, postages, and general and petty disbursements	440	6	1			
				1906	17	11
Reassurances, paid for reassurances				81	2	11
Loans and investments, for loans, &c. granted—						
As per last report	2426	1	1			
During the year	3832	15	1			
	6258	16	2			
Less amounts repaid	2488	14	3			
				3770	1	11
Carried forward				£7594	19	0

				£.	s.	d.
Brought forward				7594	19	0
Premiums, for premiums withheld during the year on policies on the half-credit system, and now due to the society				311	19	6
By agencies accounts, for amount now due from agents				388	17	7
1852, March 25.						
Balance, consisting of—						
Balance at Messrs. Masterman & Co.'s	246	0	9			
Cash on hand	207	4	11			
				453	5	8
				£8749	1	9

Cambrian and Universal Insurance Company.—First Annual General Meeting, July, 1851.—The report stated that the business comprised in the balance-sheet embraced a period of about nine months to the 31st December last, during which time £1,100 was received for premiums. The preliminary expenses amounted to little more than £600, which, with one or two items to come into this year's account, will bring the total preliminary expenses scarcely exceeding £700. The working expenditure is £560. The Company has not sustained any loss whatever. The receipts for the year, including pending acceptances likely to be completed, exceed the total amount received last year. The directors recommend that the Company shall enter upon the business of fire insurance, which they are authorized by their deed of settlement to undertake, at the September quarter. The board also think that an issue of a limited number of shares would be advisable, and, in consequence of the branch of fire insurance business being commenced, that the number of directors might be increased to 12 or 13. Interest at 4 per cent. has been declared on the paid-up capital of the Company.

Catholic Law and General Life Assurance Company.—General Meeting of the Proprietors, held 10*th July,* 1851.—A statement was laid before the meeting of the income and expenditure from June 1st, 1850, to May 31st, 1851. The report stated, that the directors, in accordance with the resolution of the last general meeting to increase the paid-up capital of the Company, had determined to make a call of £1 per share, payable either in one payment, or four quarterly payments of 5*s.* each, commencing on the 20th January, 1851. Instalments have been paid upon 3,796 shares, and the full call of £1 upon 3,451 shares, making a total received of £4,776. 5*s.* in respect of this call. Five claims by death have occurred during the year for £1,560, of which £500 has been settled, and the remainder is under consideration.

The sums received in the year ending 30th May, 1850, were £909. 14*s.* 3*d.* for new annual premiums, and £626. 18*s.* 6*d.* for annuities, making in all £1,536. 12*s.* 9*d.*; but during the past year the sum of £938. 7*s.* 1*d.* has been received for new annual premiums, and £1,802. 14*s.* 5*d.* for annuities, making £2,741. 1*s.* 6*d.* as the total new business, being an excess for this year over the last of £1,204. 8*s.* 9*d.*

Since the commencement of the Society's operations to the 1st June, 1851, 505 assurances have been effected, to the extent of £142,936. 17*s.*, producing in annual premiums £4,798. 8*s.* 11*d.*; but of these 96 have lapsed, leaving the annual income on the 1st June last at £3,653. 2*s.* 4*d.*

During the past year the directors have granted on loans on good security £4,000. An "operatives' fund" has been established, for the

assurance of sums under £50, to protect the working classes from the insecure burial clubs so frequent in the country. 280 members have joined in London alone. The business is carried on at a branch office, and does not all interfere with the chief office and its arrangements.

Catholic Law and General Life Assurance Company.—Annual General Meeting, held 22nd July, 1852.—The report stated, that in accordance with the resolution of the meeting in July, 1850, a call was made in October of that year of £1 per share, of which £5,790 had been received, there yet remaining due by the shareholders to complete the call £3,062. The application for policies was for the amount of £40,262. 18*s.*, of which £29,772 had been accepted, giving in annual premiums £632. 11*s.* 10*d.* The "operatives' fund," spoken of in the last report, has been successfully carried out, and the sum of £144. 3*s.* 7*d.* had been received from 1,076 persons assuring in that fund. The chairman observed that the directors had carried out a system of rigid economy in every branch of expenditure, retrenching half the amount of their own allowance, and the chairman and deputy chairman having entirely given up the sum set apart for them.

Church of England Life and Fire Assurance Institution.—Annual General Meeting, June, 1851.—In the life department it appeared that the new business for 1850 again exceeded the assurances opened in previous years. The claims paid were nearly met by the new premiums of the year, and the receipts on the lapsed policies considerably exceeded the claims.

In the fire department an increase also had taken place, and the same favourable rate of claims again appeared—the losses being under 30 per cent. of the premiums.

Church of England Life and Fire Assurance Institution.—At the annual meeting, held June, 1852, it was stated that the new life policies issued during the past year considerably exceeded that of any previous year, especially amongst the clergy, whilst the claims paid were less than the receipts on lapsed policies. In the fire department the losses were under 10 per cent. of the receipts.

City of London Life Assurance Society.—Annual General Meeting, held January, 1851.—From the report it appears that the claims during the past year amounted to £7,720. The sum assured in new policies for the year amounted to £75,433. 10*s.* 4*d.*, producing an annual income of £2,504. 19*s.* 11*d.* The total sum now assured was £265,827, yielding an annual income of £9,235. 2*s.* 11*d.*; a further amount of assurances for £24,500 had been declined. Since the close of the Society's financial year (31st October last), the further sum of £4,420 had been assured, and assurances for £5,600 were in the course of completion, making together £10,020. The experiment of a West-end branch, not being attended with success, had been abandoned. From the balance-sheet it appeared that the receipts, including balances from last year, were £21,460. 12*s.*, and the total expenditure of all kinds £12,425. 16*s.* 7*d.*, leaving a balance of £15,034. 15*s.* 5*d.* On the debtor side the principal items were—premiums received £8,507. 2*s.* 10*d.*, and the purchase of immediate and deferred annuities £3,030. 13*s.* 4*d.* On the credit side the principal items were—charges of manage-

ment, £2,627; incidental expenses, £801. 16*s.* 11*d.*; and claims on policies, £7,720.

A member stated, that having analyzed the accounts, he found that from the commencement of the Society about £31,300 had been received in premiums and £8,000 paid in losses (about 26 per cent.), whereas they might reasonably have expected about 34 per cent.; but, contending that they ought to have in hand a larger sum as the representative of the policies effected, suggested that the accounts should be placed before competent and disinterested parties to estimate the position of the Society, and ascertain whether it could not be conducted on more economical principles. After some discussion, the report and accounts were received and adopted, and arrangements made for an examination of the accounts and position of the Society by the actuary, the member above referred to, and a sub-committee of directors to be appointed for the purpose. A dividend at the rate of 5 per cent. per annum on the amount of paid-up capital was agreed to.

City of London Life Assurance Society.—Annual Meeting, January, 1852.—The report stated that the amount of claims was considerably less than might have been attained according to the law of mortality assumed as the basis of the rates of the Society. As the deed of constitution provides that a complete investigation of the assets and liabilities of the Society, on the 31st December, 1851, should be made with the view of ascertaining the profits for the preceding six years, to be reported at an extraordinary general meeting, and as such statement is now being prepared, any approximate analysis at this time is unnecessary. The total sum now assured by the Society is £258,979. 8*s.* 1*d.*, and the annual income of the Society is now £9,563. 8*s.* 3*d.*; 153 proposals during the past year, amounting to the sum of £40,877. 17*s.*, have been accepted and completed, 45 proposals for additional assurances for £24,700 have been declined, and since the 31st October last further assurances to the amount of £6,350 have been accepted, and 10 others are under consideration, for £5,700. The sum of £12,431. 12*s.* 4*d.* has been advanced on securities independent of temporary investments, amounting to £3,119. 4*s.* 5*d.*, and it will be observed from the balance-sheets that the assets of the Society have been increased during the past year to the extent of £50,000. The claims during the past year have amounted only to £1,630. A dividend was declared at the rate of 5 per cent. per annum, to be paid to the shareholders.

City of London Life Assurance Society.—Extraordinary Meeting, held June, 1852.—The meeting was for the purpose of considering the propriety of declaring a bonus on the stock of the Company. The report stated that the Society had now been in existence six years, the period fixed by the deed of settlement for the first declaration and distribution of the profits of the Society. From the commencement of the Society to the 31st December last there have been issued 1,041 policies, covering assurances to the extent of £383,578. 17*s.* 4*d.*, and upon discontinued policies there have been received premiums to the amount of £7,063. 18*s.* 9*d.*, whilst on 15 claims the sum of £9,849 has been paid. The distribution of profits is based on a triennial division after the first investigation. The directors declare the following as the distributable profits on the present occasion:—
1. On the mutual branch, a sum equivalent to a cash bonus of 20 per cent.

on premiums paid on policies of five years' standing and upwards, to be appropriated at the option of parties beneficially interested, either in diminution of premiums for the next three years, or a permanent addition to the policies, giving on an average a bonus of six guineas per cent. as an addition to such policies. 2. On the proprietary branch, an addition of £6. 5*s.* per cent. to the capital stock of the Society.

Clergy Mutual Assurance Society.—Annual General Meeting, held August, 1851.—*Report for the year ending* 31*st May,* 1851.—There have been 238 proposals for assurance received during the past year, of which 175 were upon life. Of the 175 proposals upon life, 151 were accepted, to the amount of £130,000; and 20, amounting to £21,850, were declined. The number of life policies at present existing is 2,030, and the amount of annual premiums thereon, £50,971. 1*s.* 7*d.*; the total amount assured upon life is £1,827,768. Eleven members holding life policies have died during the year; and the aggregate amount of the claims upon their assurances is £15,922; and £459. 5*s.* 7*d.* has been paid for £5,600 assurances surrendered. Eighteen members, having assurances for provision during sickness, have received from the funds of the Society, according to their respective claims, the sum of £929. 8*s.*; and two policies have been surrendered for the payment of £69. 1*s.* Claims under endowment policies, £6,800; ditto, education annuities, £2,030; ditto, deferred and temporary annuities, £602. 4*s.*, have been paid during the year. The total income of the Society has increased from £73,384. 19*s.* 4*d.* to £77,478. 10*s.* 2*d.*, being an increase of £4,093. 10*s.* 10*d.* in the year. After payment of all claims and expenses during the year, an increase of £49,441. 13*s.* 10*d.* has been made to the property of the Society, making an aggregate capital of £482,772. 19*s.* 3*d.* The prosperous working of the Society has been greatly facilitated by new provisions introduced into the rules of the Society in December last, under sanction of the Act 13 & 14 Vict., c. 116. Many members have been accommodated with loans on the security of the value of their policies. The privilege of effecting assurances upon life in the Society, hitherto confined to clergymen, and the wives, widows, and relations of clergymen, has been extended to the relations of the wives of clergymen.

Clergy Mutual Assurance Society.—General Meeting, held 8*th July,* 1852.—The report stated, that during the year ending 31st May, 1852, there have been 280 proposals for assurances received in the last year, of which 194 were upon life. Of the above 194 proposals upon life, 177 were accepted, to the amount of £153,098; and 17, amounting to £19,400, were declined.

The number of life policies at present existing is 2,164, and the amount of annual premiums payable upon such policies is £48,418. 16*s.** The total amount assured upon life is £1,950,356.

Fourteen members holding life policies have died during the year, and the aggregate amount of the claims upon their assurances is £20,700. Assurances upon life, amounting to £9,058, have been purchased of members desirous of discontinuing them, and the sum of £1,229, 7*s.* 10*d.* has been paid to them for the same. Fourteen members, having assurances

* It will be seen, in a subsequent part of the report, that a reduction in the annual premiums payable upon life assurances existing on 1st June, 1851, was made by means of bonus since the last year's report; and similar reductions were also made, through bonus, in the years 1836, 1841, and 1846.

for provision during sickness, have received from the funds of the Society, according to their respective claims, the sum of £826. 10*s.*; and five policies have been discontinued, the sum of £121. 12*s.* 7*d.* having been paid for their surrender.

Claims under endowment policies, amounting to	£7,350	0	0
Ditto education annuities	1,980	0	0
Ditto deferred and temporary annuities	687	9	0

have been paid during the year.

The total income of the Society, after reduction of it by bonus, is £77,231. 0*s.* 3*d.* After payment of all claims and expenses during the year, an increase of £41,562. 0*s.* 9*d.* has been made to the property of the Society, making an aggregate capital of £524,335.

The directors have the satisfaction of informing the meeting, that upon the fourth quinquennial investigation of the accounts of the Society, by Charles Ansell, Esq., actuary to the Society, on 1st June, 1851, a large surplus capital was found existing on the life assurance branch, to be dealt with as bonus under Rule 31; and under the direction, and with the certified sanction, of Mr. Ansell, such surplus capital was appropriated to the reduction of the annual premiums payable upon the then existing life assurances. The total amount of annual premiums upon life assurances, previous to the bonus in June, 1851, was £50,758. 5*s.* 4*d.* The amount of bonus then appropriated was £79,485. 17*s.* 4*d.* The amount of annual premium extinguished by such bonus was £6,290. 2*s.* 5*d.* The total amount of annual premium payable after such extinction by bonus on 1st June, 1851, was £44,468. 2*s.* 11*d.*, instead of £50,758. 5*s.* 4*d.* In 18 cases of life assurance, where there was no annual premium remaining to be paid upon policies, additions were made to the capital sums assured by such policies: the total amount of such additions was £1,398. The total amount assured upon life when the bonus of 1846 (1st June) was appropriated was £1,248,429; and at the bonus of 1851 it was £1,827,768. The number of deaths of members holding life assurances in the interval of 5 years between the bonus of 1846 and the bonus of 1851 was 49; and the amount paid to claimants upon the assurances held by such 49 members was £54,949. 9*s.* 9*d.*

Taking the low average of £1,450,000 as the total sum assured during the 5 years as above, the claims, it will be seen, did not amount to $\frac{3}{4}$ per cent. per annum upon such sum assured; exhibiting a remarkably low degree of mortality amongst the members of this Society, and the consequent great advantage to the Clergy in having a Society in which they as a select body may make assurances upon their lives.

Cash Account, 1st June, 1851, *to* 31*st May,* 1852.

Dr.	£.	s.	d.
To balance of cash at bankers, Messrs. Coutts & Co.	2,288	9	4
To balance in hands of secretaries	40	17	11
To amount of policy stamps in hand	96	4	6
To premiums received on assurances	58,954	2	3
To discount received on purchase of policy stamps	5	6	6
To balance received on excess payments	25	18	4
To fines	116	9	2
To interest on Government debentures	11,561	2	0
Ditto New 3¼ per Cents.	501	15	6
Ditto mortgages	6,482	15	0
Ditto loans on policies	226	0	5
To repayment of loans on policies	144	0	0
	£80,443	0	11

Cr.	£.	s.	d.
By payments on assurances for sickness	970	4	1
Ditto deferred annuities	435	5	0
Ditto education annuities	1,946	7	4
Ditto temporary reversionary annuities	252	4	0
Ditto endowments	7,649	13	11
Ditto life assurance branch	20,629	7	10
By payment of property tax	158	14	11
By investments in Government debentures	18,661	2	0
By amount invested in New 3¼ per Cents.	16,878	0	6
By amount invested in loans on policies	4,772	0	0
By cash—general expenses of management	3,229	11	4
Ditto extraordinary expenses, including those for investigation of Society's accounts, appropriating bonus, and other charges incidental to *this year*	1,040	0	0
By amount of policy stamps in hand	78	13	6
By balance in hands of secretaries	80	4	1
By balance of cash in hands of bankers, Messrs. Coutts & Co.	3,661	12	5
	£80,443	0	11

Property of the Society, and how placed.

	£.	s.	d.
Investments in Government debentures	314,701	5	4
Investments in New 3¼ per Cents.	23,507	4	8
Investments in mortgages of freehold landed property	173,000	0	0
Investments in loans on security of policies	9,306	0	0
Amount of policy stamps on hand	78	13	6
Balance in hands of secretaries	80	4	1
Balance of cash in hands of bankers, Messrs. Coutts & Co.	3,661	12	5
	£524,335	0	0

Clydesdale Mutual Cattle Insurance Association.—Fourth Annual Report, June, 1852.—There have been 122 policies issued, showing an increase of 22 over the preceding year; embracing 2,199 head of cattle, 219 horses, and 8 pigs. The value of the whole stock insured during the past year amounted to £22,492. 10*s*. The rates exacted for cattle were 2½ per cent., and for horses 3½ per cent.

The directors refer to the tables in the appendix, illustrating the business done, the averages of the value of the descriptions of stocks insured, the actual losses and their causes, and the per centage of losses on the numbers covered. These tables, which it is proposed to have prepared annually, will afford valuable data, as the Association progresses, from which to approximate more accurately the averages necessary upon any alteration of the rates now exacted.

The losses on horses have been considerably less, in proportion to value, than those on cattle, and the directors therefore recommend that the rates on that class should be reduced to those exigible for cattle, excepting the progressive per centage in value.

The year 1850 was marked by an unusual number of deaths amongst cattle from Pleura Pneumonia, and the directors are of opinion that this year there has been little abatement of that scourge. By reference to the appendix, Nos. 2 and 3, it will be seen that the per centage of deaths from that disease is about 2, while from others only 1½. Keeping in view previous experience, it must be apparent that, as regards cattle, Pleura Pneumonia is most to be feared; and as that epidemic has appeared among

the best stocks, and in the most healthy places, where least expected, agriculturists ought to be impressed fully with the advantages and necessities of insurance against such contingencies.

The rule of having resident directors in each parish in which members reside, and every member having a tangible interest in preventing bad or doubtful stocks being insured, or fraud attempted on the Association in the matter of losses, and the accurate information thus at all times at command upon every subject in which the Association is concerned, has contributed greatly to the perfect security hitherto afforded by this institution, and now firmly established. It must be apparent that a Proprietary Company can never possess the same advantages, and so cannot select their risks. Their losses must of necessity, therefore, in proportion be greater. And, again, the working expenses of this Association are confined to matters only absolutely necessary, there being no paid staff of officers, which in Proprietary Companies is indispensable. These circumstances clearly demonstrate, that under the mutual system low rates, security, and punctuality of settlement are attainable.

Treasurer in account with the "Clydesdale Mutual Cattle Insurance Association."

1851.	*Account*, 1851.	£.	s.	d.
Jan. 31.	To balance in treasurer's hands	8	9	11½
	„ Cash in bank	12	10	9
	„ Balance of premiums receivable	60	10	0
	„ Balance due to treasurer	3	14	0
		85	4	8½
Feb. 5.	By paid sundry losses	62	5	0
	„ Management account, 1850	8	8	0
	„ Advertising, printing report, rules, &c.	8	5	6
	„ Servant	1	0	0
	„ Balance of premiums outstanding	2	6	2½
		£85	4	8½
1852.	*Account*, 1852.			
Jan. 31.	To balance of premiums outstanding	5	6	2½
	„ Premiums receivable on 122 policies	547	14	1
	„ Fees of 20 entrants, at 2*s.* 6*d.*	2	10	0
	„ Salvage on losses	42	11	2½
	„ Deposits forfeited	2	3	6
	„ Interest on bank account	3	14	3
	„ Balance due to treasurer	7	11	8½
		611	10	11½
Jan. 31.	By balance due treasurer, in 1851	3	14	0
	„ paid sundry losses	554	15	0
	„ „ Printing, advertising, &c.	4	9	0
	„ „ Management account for 1851	8	8	0
	„ Balance of premiums outstanding	40	4	11½
		£611	10	11½

No. I.—*Comparative view of business done for two last years.*

STOCK INSURED.								
	Cattle.	Value.	Horses.	Value.	Pigs.	Value.	Gross Value.
		£. s.		£		£. s.	£. s.
1850-1 ...	1468	11,752 15	153	3618	5	6 0	15,376 15
1851-2 ...	2199	17,681 0	219	4807	3	4 10	22,492 10
Increase 1851-2 ...	731	5,928 5	66	1189	..	..	7,115 15
Decrease.....					2	1 10	

Average insured value of cattle per head	£8 0 0
Do. do. of horses „	22 0 0
Do. do. of pigs „	1 10 0

No. II.—*Losses.*

Cattle	77
Horses	8
Per centage from pleura-pneumonia	2·046
„ from other diseases	1·455
Gross per centage of losses on number of cattle insured . . .	3·501
Gross per centage of losses on number of horses insured . . .	3·653

No. III.—*Diseases causing the foregoing losses.*

Pleura-pneumonia	45
Inflammation in calf-bed	5
Murrain	2
Ruptured blood-vessels	2
Diseased foot	2
Black leg	3
Inflammation of kidneys	1
Purging	1
Swelling and burst	6
Wasting	1
Diseased liver	1
Do. moniplies	1
Dropsy	3
Diseased heart	1
Stoppage in bowels	2
Accident	1
Cattle dead, in whole	77
Glanders	1
Cancer	1
Inflammation	3
Diseased liver	1
Foaling	1
Accident	1
Horses dead, in whole	8

Summary of the Accounts registered by London Life Assurance Companies, Compiled from the Abstracts of these Accounts,

RECEIPTS.

1	2	3	4	5	6	7	8	
Capital paid up.	Premiums.	Purchase-money for Annuities.	Deposits and Investments.	Premiums.—Purchase of Annuities or Investments not distinguished.	Total of cols. 2, 3, 4, 5.	Interest and other receipts.	Total receipts, cols. 1, 6, 7.	NAME OF COMPANY.
£	£	£	£	£	£	£	£	
1,895	3,094	..	2,279	..	5,373	246	7,514	Ægis
..	..	..	..	33,348	*b* 33,348	..	33,348	British Empire Mutual
14,014	..	..	..	11,789	11,789	684	*f* 26,487	Catholic Law and General
8,589	35,022	4,481	..	..	39,503	*i* 2,751	50,843	City of London
8,942	..	..	..	16,242	16,242	243	25,427	Consolidated Investment
k (9,357)	14,103	..	..	..	14,103	41	23,501	Engineers', Masonic, &c.
3,651	10,727	2,537	..	..	13,264	175	17,090	English Widows' Fund
3,933	1,066	..	..	..	1,066	231	5,230	Etonian
12,132	31,080	4,053	..	..	35,133	*l* 1,671	48,936	Gresham
4,940	24,225	2,252	..	..	26,477	508	31,925	India and London
6,104	2,184	..	1,200	..	3,384	2	9,490	Industrial and General
3,532	1,294	..	..	..	1,294	14	4,840	Law Property
13,818	14,590	582	..	..	15,172	2,679	31,669	Legal and Commercial
n (3,000)	13,219	..	..	..	13,219	18	16,237	London Indisputable
o (5,000)	4,328	..	374	..	4,702	127	9,829	London Mutual Life and Guarantee
11,625	8,505	..	..	..	8,505	*q* 2,647	22,777	London and Provincial Joint Stock
36,990	41,165	6,081	..	..	47,246	9,797	94,033	London and Provincial Law
12,500	6,565	..	..	..	6,565	607	19,672	Mentor
14,584	7,784	..	..	..	7,784	233	22,601	Metropolitan Counties
6,663	13,618	751	..	..	14,369	128	21,160	Mitre
19,226	13,412	4,403	8,040	..	25,855	..	45,081	Professional
s (11,032)	3,226	..	200	..	3,426	..	14,458	Prudential Mutual
19,646	34,072	2,031	..	..	36,103	3,730	59,479	Solicitors' and General
46,524	28,566	4,319	..	..	32,885	6,735	86,144	Sovereign
3,255	3,706	..	600	..	4,306	10	7,571	Times Life and Guarantee
6,517	2,361	..	..	..	2,361	191	9,069	Tontine
8,447	3,496	..	..	..	3,496	9	11,952	United Guarantee and Life
t (2,000)	4,110	..	..	..	4,110	5	6,115	United Mutual Mining and General
297,916	325,518	31,490	12,693	61,379	431,080	33,482	762,478	(28 Companies.)

a. This sum is exclusive of £489 of accounts then unpaid, making in all £3,819 of charges, besides £430 for furniture and office fixtures, the value of which is included in funds in hand. The amount included for dividends is not distinguished from the general charges.

b. Including premiums of assurance, and sums received for annuities and endowments.

c. Includes endowments.

d. Includes extension expenses, £3,920; other charges, £586.

e. In the recorded account of liabilities and assets, at 31st Dec., 1850, the assets of the Company are stated at £19,107, viz.—

	£
Invested in mortgage and other securities	11,671
(The particulars of the difference between this sum and £13,655, entered in the discharge, are not given.)	
Six-tenths of office and agency outfits	3,879
Due by agents and bankers	3,557
Sum of assets	19,107
Deduct therefrom bills stated to be unpaid	121
	£18,986

g. Includes annuities paid, interest allowed shareholders, and interest paid on loans.

h. Furniture, £778; branch charges, £583; establishing foreign agencies, £912.

i. Includes loans, less repayments, £750; interest in favour of the Society, £1,869; profit on reversion and on Exchequer Bills, £132.

k. Mutual Company, £9,357; loans by directors, and some other receipts, 1st June to 1st Dec., 1848.

l. Includes loan guarantee fund, £357; interest and discount received, £1,314.

m. Deducting from the balance in the Company's favour, £3,422 for preliminary expenses paid.

n. Mutual Company. £3,000 guarantee fund.

o. Mutual Company. £5,000 temporary capital fund.

p. To the expenses, £4,718, add further:—Amount due 31st Dec., 1850; agents' commission, £100; tradesmen's bills unpaid, £64; directors' fees for attendance, £620; sum of expenses, £5,502; from the funds in hand, £5510. Deduct the following:—Sums due to directors and others, as above, £784; ditto to depositors, £374; interest on capital fund and income tax, £650; leaving £3,292 available funds.

he passing of the Act 7 & 8 Vict., cap. 110 (*5th Sept.* 1844), *to 5th Feb.*, 1852.
hed by Robert Christie, Esq., Edinburgh.

DISBURSEMENTS.

Period.	9 No. of Years.	10 Claims Paid.	11 Annuities Paid.	12 Policies surrendered, and other Payments.	13 Preliminary Expenses.	14 Current Expenses, including Interest and Dividends on Shares.	15 Other Charges.	16 General Expenses—The three preceding Columns not distinguished.	17 Total Expenses, cols. 12, 14, 15, 16.	18 Funds in hand.	19 Total cols. 10, 11, 12, 17, 18.	20 Assurances in force at the date of last
		£	£	£	£	£	£	£	£	£	£	£
48 to 31 Dec. 50	2·98	1,300	15	..	..	..	..	3,330	*a* 3,330	2,869	7,514	..
47 „ 31 Dec. 50	3·93	1,544	*c* 126	..	2,258	7,702	*d* 4,506	..	14,466	*e* 17,212	33,348	311,
46 „ 1 June 51	4·89	3,400	*g* 2,070	47	1,994	13,606	*h* 2,273	..	17,873	3,097	26,487	*67,
45 „ 31 Oct. 51	5·86	9,849	712	105	2,576	17,504	..	..	20,080	20,097	50,843	258,
46 „ 30 Sept. 51	4·99	1,350	2,566	..	652	9,915	..	..	10,567	10,944	25,427	*85,
												(20 Apr
48 „ 31 Dec. 50	2·58	2,534	..	303	..	..	..	14,579	14,579	6,085	23,501	*223,
47 „ 31 Dec. 51	4·75	2,690	408	24	1,911	7,632	..	..	9,543	4,425	17,090	141,
47 „ 10 Sept. 49	2·02	..	..	..	..	3,269	..	..	3,269	1,961	5,230	*24,
48 „ 31 July 51	3·	8,471	365	..	3,422	12,618	..	..	16,040	*m* 24,060	48,936	452,
46 „ 31 Dec. 50	4·69	12,394	..	..	..	..	..	12,919	12,919	6,612	31,925	*299,
49 „ 13 Feb. 51	1·53	198	..	..	3,572	3,225	..	..	6,797	2,495	9,490	*103,
50 „ 17 May 51	1·	..	..	..	1,162	727	..	..	1,889	2,951	4,840	*38,
45 „ 31 Dec. 49	4·42	2,449	55	16	..	..	..	11,922	11,922	17,227	31,669	177,
48 „ 31 Dec. 50	2·52	2,199	..	..	..	..	..	6,993	6,993	7,045	16,237	*243,
49 „ 31 Dec. 50	1·51	..	..	..	..	..	..	4,729	*p* 4,729	5,100	9,829	144,
47 „ 13 Sept. 51	4·48	1,292	..	4	..	..	..	8,889	8,889	12,592	22,777	102,
46 „ 31 Dec. 50	4·99	6,816	3,311	150	2,584	11,639	..	..	14,223	69,533	94,033	*386,
48 „ 31 Dec. 50	2·47	1,400	..	..	4,671	5,631	..	..	10,302	7,970	19,672	160,
48 „ 25 Mar. 50	1·99	..	..	..	2,987	7,153	..	..	10,140	12,461	22,601	*233,
46 „ 17 Apr. 51	4·79	2,650	67	*r* 517	..	..	..	9,324	9,324	8,602	21,160	137,
47 „ 31 Dec. 50	3·78	6,913	339	..	..	..	..	24,017	24,017	13,812	45,081	*354,
48 „ 24 Dec. 51	3·06	..	..	..	..	..	..	4,833	4,833	9,625	14,458	*47,
45 „ 31 Dec. 50	5·10	4,548	640	28	2,376	15,785	..	..	18,161	36,102	59,479	*362,
46 „ 9 Oct. 51	5·75	2,550	1,143	98	3,587	24,744	..	..	28,331	54,022	86,144	318,
49 „ 1 Apr. 51	2·33	50	..	..	..	..	..	5,183	5,183	2,338	7,571	*142,
46 „ 31 Dec. 48	2·45	..	..	..	..	..	..	6,229	6,229	2,840	9,069	..
49 „ 31 Dec. 50	1·71	554	..	..	..	..	..	7,730	7,730	3,668	11,952	*84,
49 „ 31 May 51	1·79	..	..	..	..	..	..	3,998	3,998	2,117	6,115	109,
	95·26 Aver. 3 4/10	75,151	11,817	1,292	33,752	141,150	6,779	124,675	306,356	367,862	762,478	5,010,

f. Loans to the Company after repayments deducted are stated to be £6,321, by which the amount of loans as entered in the statement of the Company's assets, 1st June, 1851, being diminished, will leave £1,009 as loans advanced by the Company, and included in funds in hand. The latter item also includes £1,950, cash in hand and balances due to the Company, 1st June, 1851, and £138, being part of the agents' balances and other sums outstanding at 31st May, 1850, and not accounted for in 1850-51.

It is stated in the appendix to the account, 1850-51, that the assets of the Company, 1st June, 1851, stood thus:—

		£
Cash in hand, and balances due to the Company		1,950
Loans by the Company	£7,330	
On the other hand, the Company were indebted for loans	5,501	
		1,829
Furniture belonging to the Company		700
Arrears of interest due to the Company		110
Sum of these		4,589
From which deduct the following:—		
Sundry small balances due by the Company	£51	
Arrears of interest due to shareholders, and on money borrowed	225	
Due to directors	193	
		469
Balance of assets in favour of the Company		4,120

Besides £160,941 of balance of subscribed capital not paid up.

g. Includes £1,419 received on shares relinquished, considered to be profit; £1,136, interest received; and £92, small items of profit.

r. Including in this sum annuities and reassurances, stated together in 1849-50, £209.

s. Mutual Company; but calls on shares stated as £2,232, and advances to the Society £8,800.

t. Mutual Company. £2,000 advanced by directors.

u. These amounts are taken from the *Assurance Magazine*, vol. ii., p 354, &c., and those marked * are merely approximations deduced from the average of premiums, &c.

INSTITUTE OF ACTUARIES.

PROCEEDINGS OF THE INSTITUTE.

The following donations were announced at the Sixth and Seventh Sessional Meetings, referred to in our last Number:—

	Presented by
Transactions of the Royal Society of Edinburgh, 1849–50, 1850–51. Parts 1 & 2, vol. xx.	The Society.
Transactions of the Royal Institution of Great Britain, 1851–52. Nos. from 1 to 9 inclusive	The Institution.
Assurance Magazine, No. 2.	Mr. Mackenzie.
Babbage (C.), Table of the Logarithms of the Natural Numbers from 1 to 108·000. (A Presentation Copy.) 1844	Mr. Oliver.
De Morgan's (A.) Elements of Algebra. Second Edit. 1837	Do.
Hind's (J.) Elements of Algebra. Fourth Edition. 1839	Do.
Horsley's Elementary Treatises on Practical Mathematics. 1801	Do.
Hutton's (C.) Mathematical Tables. Seventh Edit. 1830	Do.
Potts' (R.) Euclid's Elements of Geometry. New Edition. 1845	Do.
Potts' (R.) Appendix to the larger Edition of Euclid's Elements of Geometry. 1847	Do.
Wood's (J.) Elements of Algebra, by Thomas Lund, B.D. Twelfth Edition. 1845	Do.
Report on the Edinburgh School of Arts Friendly Society. By William Wood, Esq. Edinburgh, 1850	The Author.
Guilmin (A.), Cours d'Arithmétique. Nouveau Tirage. Paris. 1852	Mr. Minasi.
Bentham (J.), Defence of Usury. 1787	Mr. E. Thompson
Malthus (T. R.) On the Principle of Population. 2 vols.	Do.
Necker (M.), De l'Administration des Finances de la France, 1784. Vols. 2 & 3	Do.
Assurance Magazine, No. 2.	Mr. Wm. Lewis.
Quarterly Journal of the Geological Society. Parts 1 & 2, vol. viii.	The Society.
Proceedings of the Pathological Society, Session 1850–51	Do.
Charter and Bye-Laws of the Royal Institute of British Architects, and Report of the Council, 1851	The Institute.
Gairdner (W. J.) On the Registration of the Causes of Death. 1852. (3 Copies)	The Author.
Histoire de l'Académie Royale des Sciences, Paris, from 1666 to 1778. 168 vols. bound.	Mr. Samuel Brown.
La Prudence Société d'Assurances Mutuelles Immobilières contre l'Incendie. Statuts. Saint Germain-en-Laye, 1841	M. Gaignoeux (Rouen).
La Normandie. Instructions aux Représentants de la Normandie. Rouen. (No date)	Do.
La Normandie. Société d'Assurance Mutuelle Immobilière contre l'Incendie. Rouen. 1840	Do.
La Normandie. Instructions a MM. Les Directeurs Particuliers d'Arrondissement a MM. Les Commissaires-estimateurs et Receveurs de la Normandie. Rouen. 1840	Do.
La Tutélaire Société d'Assurances Mutuelles Immobilières contre l'Incendie. Siége Social. Paris. 1847	Do.
Société d'Assurances Mutuelles Immobilières contre l'Incendie. Procès Verbal de la Séance du Conseil Général Séance d'Ouverture. Lyons. 1849	M. Gaignoeux. (Rouen).
Société d'Assurances Mutuelles Immobilières contre l'Incendie. Statuts. 1843	Do.
A Paper on Marine Insurance	Mr. W. Lance (Lloyd's.)

Eighth Sessional Meeting, 1851–52.—*Monday*, 28*th June*, 1852.

CHARLES JELLICOE, ESQ., V.P., in the Chair.

The Minutes of the last Sessional Meeting having been read and confirmed, the Secretary announced the following donations to the Library :—

	Presented by
Sixteen Reports and Statutes of German Assurance Companies	Herr Daninos.
Notice ("Paper") Sur les Compagnies d'Assurances d'Autriche. 1852. By Herr A. Daninos . .	The Author.
Dreiundzwanzigster Rechenschaftsbericht der Lebensversicherungsbank für Deutschland (in Gotha) für das Jahr. 1851	Herr Rath G. Hopf.
Baily (F.), Tables for the Purchasing and Renewing of Leases for Terms of Years certain, and for Lives; with an Appendix. Second Edition. 1807 . . .	Mr. W. M. Browne.
Babbage C.), Reflections on the Decline of Science in England, and on some of its causes. 1830. . .	Do.
Clark (S.), Laws of Chance, or a Mathematical Investigation of the Probabilities arising from any proposed circumstance of Play. 1758	Do.
Condorcet (M. Le Marquis de), Essai sur l'Application de l'Analyse à la Probabilité des Décisions. Rendues à la Pluralité des Voix. Paris. 1785 . . .	Do.
De Morgan (A.), Elements of Arithmetic. Fifth edition. 1851	Do.
Encyclopédie Méthodique Mathématique, par MM. Alembert, L'Abbé Bossut, De la Lande, Le Marquis de Condorcet, &c. Paris. 1784. 6 vols. . .	Do.
Euler (L.), Letters to a German Princess on different subjects in Physics and Philosophy, with Original Notes. Translated from the French, by Henry Hunter, D.D. 2 vols. 1795	Do.
Filipowski (H. E.), A Table of Anti-Logarithms, containing, to seven places of Decimals, Natural Numbers answering to all Logarithms from ·00001 to ·99999, with an Appendix. Second Edition. 1851 . .	Do.
Laplace (M. Le Marquis de), Exposition du Système du Monde. Sixième édition. Paris. 1835 . .	Do.
Quetelet (A.), Sur le Climat de la Belgique. Première Partie. Bruxelles. 1845	Do.
Quetelet (A.), Nouvelles Tables de Mortalité pour la Belgique. Bruxelles. 1849	Do.
Quetelet (A.), Nouvelles Tables de Population pour la Belgique. Bruxelles. 1850	Do.
Pharmaceutical Journal and Transactions. Nos. from 7 to 12 inclusive, vol. xi.	The Society.
Hunt (R.), Poetry of Science, or Studies of the Physical Phenomena of Nature. Second edition. 1849 .	Mr. Oliver.
Sur la Probabilité des Erreurs d'àpres la Méthode des moindres Carrés, par M. J. J. Bienaymé, Inspecteur Général des Finances. Paris. 1852 . . .	The Author.
Robertson (A.), Periodical Savings applied to Provident Purposes, with Remarks on the Constitution and Practice of Friendly, Odd Fellows, Building, Freehold Land, Loan Societies, and Savings' Banks, and suggesting a Plan of Self-protecting Life Insurance. 1852. (3 copies.)	The Author.
Robertson (A.), Defects in the Practice of Life Assurance, and Suggestions for their Remedy, with Observations on the Uses and Advantages of Life Assurance, and the Constitution of Offices. Fourth edition, with Supplemental Note. 1849. (3 copies.) . . .	Do.

Hugh C. Baker, Esq., Actuary and President of the Canada Life Assurance Company, Hamilton, was unanimously elected a Fellow of the Institute.

The following Candidates, duly proposed at the last Sessional Meeting, were elected Official Associates:—

William Page, North of England Fire and Life Insurance Company.
James Moncrieff Wilson, Patriotic Assurance Company of Ireland, Dublin.

And the undermentioned were elected Associates of the Institute, viz.:—

Charles Studdert Finlaison, Royal Naval and Military Life Assurance Society.
William Lance (of Lloyds'), 3, Brabant Court, Philpot Lane.
James Noble, Norwich Union Insurance Company, Edinburgh.
Charles James Rowe, Scottish Provident Institution.
Patrick Spence, Scottish Provident Institution.

Mr. Samuel Brown then read a paper, communicated by Mr. Henry Tompkins, "On the Present State of Information relating to the Laws of Sickness and Mortality, as exemplified in the Tables of Contributions, &c., used by Friendly Societies."

Annual General Meeting, 1851–52.—*Saturday*, 3*rd July*, 1852.

CHARLES JELLICOE, ESQ., V.P., in the Chair.

Mr. Samuel Brown, one of the Honorary Secretaries, having read the circular convening the Meeting, the Chairman called upon him to read the Report of the Council on the progress of the Institute during the year, which was as follows:—

"REPORT OF THE COUNCIL.

"The events of the past session being somewhat more important and interesting than usual, the Council have deemed it desirable to make on the present occasion a more formal report to the members than has hitherto been customary.

"During the session, forty-eight new members have been elected, whilst the vacancies occasioned by retirements and death amount to thirteen only. The total number on the books of the Institute is now 244. In addition to these, four honorary members have been elected by the Institute, whilst the Council have been enabled to add to the list of corresponding members no less than forty-two of the most distinguished actuaries or managers of foreign countries; by means of whom the Institute has been put in communication with twenty-seven of the leading cities in Belgium, Canada, France, Germany, Holland, Russia, Sweden, Switzerland, and the United States of America. Already have valuable communications been received from these gentlemen; whilst the facility with which information may by their means be obtained from places the most remote has made itself sensibly felt.

"The library, which is now becoming important, has been increased during the session by presentations of no less than 614 volumes and pamphlets. Amongst the donors of these, the Council are gratified at being able to enumerate the Board of Trade, the Commissioners in Lunacy, the Commissioners of Railways, the Committee of Council on Education, the Ecclesiastical Commissioners, the General Board of Health, the Home Office, the Inspectors of Factories, the Poor Law Board, the Registrar-General, the Surveyor-General of Prisons, the Royal Astronomical Society, the Royal Scottish Society of Arts, the Statistical Society, the Royal Institution, the Royal Society of Edinburgh, the Geological, Pathological, and Pharmaceutical Societies. To many individual contributors, also, the Institute is indebted for considerable additions to the library.

"During the session eight papers of much interest have been read, and five of them printed for the members. Some of these are inserted also in the *Assurance Magazine*, and abstracts of nearly all will be found reported in the *Athenæum*, and in other periodicals.

"The Council, having long had under their consideration the great inconvenience arising from the prevailing uncertainty as to the proper rates to be charged for residence in foreign climates, and for other extra risks, and believing that data existed amongst the records of the Life Assurance Societies of this country calculated to afford the means, when collected, of arriving at the value of such risks, took measures in the early part of the session to obtain the data in question. They are happy to say that fifty-two Companies—at much cost of time and labour—readily supplied their experience, comprising in all 6,151 cases; and the Council are now engaged in the laborious task of classifying and arranging the data thus obtained, with a view to deduce from them the required information.

"The members will no doubt have noticed that a Committee of the House of Commons has been engaged during the session in the consideration of the subject of the Property and Income Tax, with a view to determine the true principles of direct taxation. It is gratifying to the Council to observe, from the remarks of the Chancellor of the Exchequer, that the evidence given before the Committee by members of the Institute has tended to throw much light on that intricate question. The Council are glad to perceive one of the most important functions of the Institute so soon called into exercise.

"Some months back a petition to the House of Commons was prepared in reference to the privileges claimed by a few Companies enrolled under the Friendly Societies Act. The Council, on consideration of the subject, being of opinion that the prayer of the petition was not quite in accordance with the liberal views which the Institute has ever sought to uphold, framed one themselves, and caused it to be presented. Both were referred to a Select Committee of the House, and members of the Institute have been examined at great length upon them. The decision of the Committee is not yet known, but there is reason to believe that the recommendation of the Committee will be in close accordance with the terms of the petition which the Council had the honour to submit.

"The inquiries of the Select Committee have not been confined to the question above alluded to solely, but have extended to almost all the points which bear upon the condition and prospects of Friendly Societies. The Council therefore look with great interest for its report, as indicating the measures likely to be taken by the legislature on this important subject, and as assisting the Council in such suggestions as they may be led to make with a view to promote the greater welfare of the Friendly Societies of Scotland, referred, as the members have no doubt observed from the Report of the Scottish Registrar, to the House of Commons by the Highland Society to the consideration of the Institute.

"The Council, for some time past, have had under their consideration the means of publishing, in a more satisfactory manner than has hitherto been done, the papers read before the Institute. They are now enabled to announce that an arrangement has been made by which such papers will hereafter appear regularly in the *Assurance Magazine*, under its intended new title of *The Assurance Magazine, and Journal of the Institute of Actuaries.* With this periodical the members will henceforth be supplied gratuitously, and the object of giving the requisite publicity to the transactions of the Institute will thus be attained, whilst the interest and convenience of the members will at the same time be duly consulted.

"Lastly, the Council have to announce that they have completed a negotiation with the Statistical Society, in accordance with which the Institute will, after Michaelmas next, be admitted on moderate terms to the use of the rooms in St. James's Square. Mr. Cheshire, they are most happy to say, has been appointed Assistant-Secretary to the Statistical Society, and will act in that capacity for both parties, very much, it is believed, to the advantage of each.

"The Council are glad to be enabled to submit these statements to the Institute, and trust they will be considered as affording sufficient evidence of the real utility and importance of its labours, not only in a professional, but in a public point of view."

The Treasurer then laid before the meeting the financial statement for the past year, by which it appeared that the receipts for the year ending the 30th of April last, including the balance from the preceding year, amounted to £683. 3*s.* 7*d.*, and the expenditure to £457. 7*s.* 5*d.*, leaving a balance in favour of the Institute of £225. 16*s.* 2*d.*

Some alterations were agreed to in the laws and constitution, chiefly in reference to an extension of the Council to twenty-two members.

The meeting then proceeded to the election of President, Council, and Officers for the year ensuing, when the Scrutineers declared the list to be as follows:—

President—John Finlaison, Esq. (late Government Actuary.)

Vice-Presidents—

Peter Hardy, Esq., F.R.S.	Francis G. P. Neison, Esq.
J. J. Sylvester, Esq., M.A., F.R.S.	Wm. Thos. Thomson, Esq., F.R.S.E.

Treasurer—John Laurence, Esq.

Honorary Secretaries—Samuel Brown, Esq.; John Hill Williams, Esq.

William Meredith Browne, Esq.	Jenkin Jones, Esq.
C. J. Bunyon, Esq., M.A.	Donald Lindsay, Esq.
Alex. Glen Finlaison, Esq.	Jeremiah Lodge, Esq., B.A.
Gilbert Laurie Finlay, Esq.	George H. Pinckard, Esq.
Federick Hendriks, Esq.	William Ratray, Esq.
William B. Hodge, Esq.	Wm. Thos. Robinson, Esq.
Holmes Ivory, Esq.	James Michael Terry, Esq.

Mr. Emmens, Mr. Henderson, and Mr. F. G. Smith were re-elected Auditors; and a vote of thanks was passed to the Council generally, for their exertions during the past year. In returning thanks on behalf of the Council, the Chairman said:

"It is obvious, gentlemen, that whatever reputation and influence the members of this profession may individually acquire by their learning, wealth, or position in the world, the reputation of the profession itself will not thereby be necessarily advanced. The only way of carrying out the latter object is by means of such an association as the Institute, in which there is public organization, and therefore public responsibility. It is quite evident, that up to the present time the profession of an actuary has not been held in that estimation which its peculiar character entitles it to. Abundant evidence can be adduced that our pursuits are generally of such an intricate nature, and occasionally require such a singular combination of the learning of the mathematician, the lawyer, the philosopher, and the political economist, as put it quite out of the power of anyone not brought up to them to discharge the duties devolving upon us with anything like efficiency or propriety. This, I am happy to say, is beginning at length to be better understood, and no doubt will soon become more so. It must be the constant object of the Institute to seize on all such great public questions as we are the natural expounders of, and to bring our peculiar knowledge to bear upon them. It is a matter of much gratification, that this has been done with a good deal of effect during the last session, as regards the questions of the Income Tax and the Friendly Societies, on both of which subjects it will shortly be seen that considerable light has been thrown by some of our members. By continuing this course, and thus using our knowledge as a body for the public advantage—by extending the range of our studies, and by gradually making our annual examinations more comprehensive and profound; la tly, by not ceasing to exert ourselves until we have secured a Bill or Charter of Incorporation, there can be little doubt that the end which we have in view will be attained, and that our profession will attain that influence and elevation of character which it is needful for the public security, and only just to ourselves, that it should arrive at."

A special vote of thanks was then passed to Mr. Jellicoe, for his unremitting attention to the interests of the Institute; whereupon he briefly expressed his sense of the kindness with which his efforts had been met, and the meeting terminated.

THE

ASSURANCE MAGAZINE,

AND JOURNAL OF

THE INSTITUTE OF ACTUARIES.

Contributions to the History of Insurance, and of the Theory of Life Contingencies. By FREDERICK HENDRIKS, ESQ., *Actuary of the Globe Insurance Company.*

(§ 24.) IN my previous sketches upon the subjects embraced in the above title, whilst, on the one hand, I was desirous to avoid burdening them with any apparently superfluous details, on the other hand, I clearly foresaw that the task would remain of following out, in at least another article, some needful explanations or justifications. To my former readers I therefore inscribe the following notes, in the anticipation of their being found not wholly unserviceable in the view just adverted to.

I may be permitted to mention that the publication of the treatise of De Wit on Life Annuities, has excited some attention in Holland; inasmuch as, whilst the love of scientific inquiry might alone have made it worth our while, as Englishmen, to forward a search for the hitherto missing document, this, in the case of our Dutch friends, acquires a stimulus in the degree of legitimate pride which they take in all that can illustrate the fame of their martyr-statesman, De Wit; and I make the assertion advisedly, that his Annuity Treatise, which the cursory reader might be disposed to look on as but a light matter in relation to that fame, is by no means so regarded by writers of eminence in Holland—men whose position and qualifications best fit them to express an opinion which is worthy of all respect on the subject.

The fresh details I am enabled to offer respecting this, in continuation of the evidence already adduced from other times and

countries, will be perceived to be usefully connected with the further facts which I shall have to present in the sequel.

The reader who recollects what is stated in the notes to sections 22 and 23 of my former paper, will understand that there was then fair presumptive evidence for assuming that the official intercourse between the Grand Pensionary De Wit and the Burgomaster Hudde led to a community of interest in establishing a properly devised national scheme of life annuities; and not only is this substantiated by subsequently acquired testimony; but the collaboration of these two remarkable men, in their studies as *financiers and actuaries,* is incontrovertibly proved by the discovery of the MS. drafts of several letters and memoirs on the subject, *in the autograph of De Wit,* preserved amongst the archives of the Netherlands, in the State collection at the Hague. For copies of these, (searched for since the publication of my paper on De Wit,) and certified by the Master of the Records, I am indebted to the polite attention of Mr. J. Heemskerk, member of the Second Chamber of the States General.

(§ 25.) To proceed with the evidence on the degree of importance attached in Holland to De Wit's treatise.—The Baron *Collot d'Escury,* in his work entitled *The Glory of Holland in the Arts and Sciences,** writes in the following terms respecting De Wit (*vide* vol. vi., p. 106):—

"He knew how to apply his scientific acquirements to the interests of the public, and even to reconcile his inclination for the sciences with the obligations of his official functions, and make it conduce to the utility of the country. Hence the so important Treatise upon the Value of Life Annuities in proportion to Redeemable Rents (*Over de Waerdye van Lyfrenten naer proportie van Losrenten*), published in 1671, and the object of which was to demonstrate that it was more advantageous to the State to borrow by way of life annuities than by redeemable rents. It however reciprocally counselled the inhabitants to give the former the preference over the latter, in the supposition that they would know how to comprehend their domestic interests, *by employing industriously,* as he says, *the surplus or excess over the ordinary rents in the accretion of their capital;* the guarantee of such a course being secure in the then universally observed economy. From that moment people were led to scrutinize the rules of the calculus of probabilities; which were in existence, it is true, but the application of which could not be made so easily or with such certainty as at the present day, now that progress has been attained in the knowledge of the laws of mortality;† and this is why *De Wit acquired a great*

* H. Baron Collot d'Escury.—*Hollands roem in Kunsten en Wetenschappen. 'S Hage en Amsterdam, gebr. v. Cleef.* 1835.

† From the most remote times the Egyptians, Jews, Greeks, and Romans bestowed a scrupulous attention upon the births and deaths of mankind, although with the two

renown through this work, which demanded so much judgment and penetration. And it also to be regretted that the treatise of De Wit was impossible to be obtained anywhere, so that Leibnitz, being in this country, was unable to see it; which however appears to me incomprehensible, since in my judgment Hudde ought to have been able to give it to him. If this great man (De Wit) had devoted himself entirely to the cultivation of the sciences, without having to fill other duties which demanded all his care, he would have shone in them with the same brilliancy which history represents him to us as diffusing upon the theatre of politics—a lustre which has excited the respect and admiration of all Europe!"

(§ 26.) *Simons,* in his work on *John De Wit and his Age,** has the following remarks (see pp. 42, *et seq.*):—

"Amongst the works which have been preserved to us through the care of Van Schooten, is the Treatise of De Wit, entitled by him *Elementa Curvarum Linearum,*—one of the most remarkable mathematical works of his time.

"Another work of De Wit, less known, but however more celebrated, is that on *The Value of Life Annuities in proportion to Redeemable Rents,* published in 1671 at the Hague, in folio, by Jacobus Scheltus, Printer in Ordinary to the States of Holland and West Friesland.

. . . . De Wit first gives the rules of the calculus of chances by simple examples, with their explanation, that is to say, to as great an extent as is necessary for his object. They are the rules which Huygens had already developed in his treatise, *De Ratiociniis in Ludo Aleæ;* but the application of these rules to the calculation of the value of life annuities is the work of De Wit, and he is, in my opinion, the first who made so useful an application of the doctrine of chances. The law of mortality was then almost entirely unknown; at that time one could only base such calculations upon more or less probable suppositions. If we

latter people the principal object was to learn the number of men fit for war; the early Christians doing the same, with the design of knowing the number of neophytes (*nieuwbekeerden*), baptized persons, apostates, and ecclesiastical elders. It is true that the practice was continued subsequently on the spur of other circumstances; but the keeping of better established registers of births and deaths does not generally extend back beyond the commencement of the seventeenth century, as has been the case in this respect in our country. However, at the time of De Wit, a great enough advance had not yet been made in this subject to warrant congratulation on the possession of sufficient observations and calculations upon the proportion of deaths to births; and it was not until the last half of the eighteenth century that the laborious Süssmilch came forward in a voluminous work (which we are acquainted with in our country under the title of *De Goddelyke Orde, heerschende in de veranderingen van het menschelyke geslacht*), with the express view of providing against the want of such calculations; and hardly had this want been remarked, before the author had numerous imitators amongst his compatriots, which imitators have written in the like spirit. With us we had, in the same century, Kersseboom, Nicholas Struyck, and Houttuyn, who all applied themselves to this work. Struyck very modestly calls his treatise, which appeared in his *Introduction to Universal Geography,* '*Gissingen*'—*i. e., conjectures*—on account, says he, of the uncertainty of his researches; he constantly, however, expresses a hope that further astonishing things will be discovered therein. As regards the rest of this subject, read especially what relates to it in the *Historical Introduction to the Essay to establish Mortuary Registers, &c. on the most appropriate footing* (*Geschiedkundige inleiding van het Onderzoek naar de doelmatigste inrigting van Sterflysten enz.*), for which Professor Suringar, of Amsterdam, obtained a prize of honour.—(C. d'E.)

* "Jan de Witt en zyn Tyd."

consider the slender progress which the calculus of probability had then made, we must look upon the whole treatise as an eminent proof of the inventive genius of its celebrated author; and Hudde, who at the request of the Grand Pensionary had examined this work, and who certainly was a competent judge, declares that it is based upon solid mathematical principles.

"De Wit draws from his calculations a conclusion that each florin of annual life rent is worth, in proportion to redeemable rents, at four per cent. per annum, more than sixteen florins. In order to prove in a more precise manner the justice of his conclusions, De Wit had recourse to a method which is above all reflection, namely, the extraction from the *Registers* of the particulars of some thousands of lives upon which life annuities had been purchased, with notes upon the amount of life annuity paid to each of them, and in this manner he also demonstrates that each florin of annual life rent was worth at least sixteen florins.

"This Treatise upon the Value of Life Annuities is very rare, and seems to have been, even at its first appearance, difficult to be obtained; and although Leibnitz wished to possess it amongst his papers, it appears nevertheless that he could not obtain a sight of it. *Bernouilli* (at that time Professor at Groningen) wrote to Leibnitz—'*Schediasma Pensionarii de Wit circa reditus ad vitam vix putem reperiri posse. Agnatus aliquis meus, qui nuper ex Batavis venit, se illud ibi reperire non potuisse mihi retulit.*'

"These two treatises are the only mathematical works which De Wit has left us; they suffice nevertheless to obtain for him a honourable rank in that science, and abundantly prove that, had it not been for pre-occupations of more paramount interest, he would have ranked amongst the first mathematicians of his day, and would perhaps have thus rivalled his countryman Huygens.'"

(§ 27.) The following extract, translated from the Baron *Collot d'Escury's* work* before cited, will be found most useful and important in arriving at a correct view respecting what will appear in the latter part of this paper as respects *Hudde's* share in the annuity calculations of De Wit:—

"Witsen has with justice called Hudde (whom Francius, in his discourses, once complimented as the Dutch Archimedes) 'the incomparable *mathematician*.' Was not this honourable title deserved by him on account of the calculations respecting the pressure of ships in the water, and to the making of which calculations gave rise the difference with Denmark, concerning the tonnage at which were to be estimated the vessels sailing to Norway to bring home timber? But there are other proofs, worthy of the praise which Hudde obtained in the midst of his fellow citizens, and especially among strangers.

His public functions, his activity in state and municipal affairs, may have hindered him, in the exact sense of the word, from publishing voluminous works. What we have learnt respecting him, what we know of him, suffices for our appreciating and ranking him amongst our most celebrated mathematicians. Those who know the works of Van Schooten,

* C. d'E. Hollands Roem, &c., 6th part, section 1, p. 100.

are acquainted with several productions of his youth, all bearing the evidences of a more than common penetration of mind. One of the subjects to which he most applied himself was 'Algebraic Equations,' a subject possessing an interest both great and general, and upon which one had, it is true, fixed rules at his time, but not sufficiently numerous, for which reason he essayed to increase them by new ones, and would perhaps have given them the needful extension, had he been able to bring out the great work which he had intended to publish in this regard. One may form some idea of it from the letters which Van Schooten communicated in 1659, and from what we may presume would have been contained in the Commentaries which he showed to Leibnitz, in the visit which the latter paid him at Amsterdam.* Has not a man who, like Hudde, from the year 1667 to his death in 1704, passed his life in the government of his country, applied his extraordinary knowledge with utility to his nation? This has been evidenced by *his calculations respecting life annuities* and loans of money which had to be raised, as well as by his labours for the good of the finances of the State. For when in 1678, by virtue of the proposition of the Grand Pensionary, a Government Commission was named (as has been done several times subsequently) to examine the condition of the pecuniary resources of the country, and to indicate the means of ameliorating them, he was chosen a member of this commission, whose report only requires to be gone through, for one to recognise in it his wise co-operation.† It is however to be regretted that Hudde, following the example of so large a number of our forefathers, seems not to have taken a sufficient care in the preservation of his manuscripts, otherwise we should certainly be acquainted with much more of his merit as a mathematician. It is said that the late celebrated Van Swinden entertained the project of making us more intimately acquainted with this illustrious countryman, but he was prevented by default of materials, probably lost, although it is presumable that they are still preserved somewhere or another, hidden or forgotten, until the time when a fortunate chance may one day lead to their discovery, which would be of the highest interest, although one might presume that the greater portion would consist of unfinished labours, in consequence of the active life of Hudde, who was twenty times burgomaster of Amsterdam."‡

* See the Commentaries of Van Schooten. The letters which the latter published under the title *Jo. Huddenii de Reductione Æquationum et de Maximis et Minimis.* Letter II. And Montuela, *Histoire des Mathématiques*, tom. ii., page 149, *et seq.*—(C.d'E.) The reader should also refer to Professor De Morgan's paper in the *Companion to the Almanac for* 1853, pages 12 and 13.—(F. H.)

† The resolution is of the 24th February, 1678, and the report was rendered to the Assembly of Holland of the twenty-fifth November following. The proposition, the resolution, and the report, are to be found in the Statements and Memoirs upon the Finances of Holland, published in 1797 by Messieurs van Herzeele and Goldberg.—(C. d'E.)

‡ As remarks Professor van Lennep, in his Memoirs (*Memorabilia*) of the Athenæum of Amsterdam, page 106, where we read [*Huddenus*]—Joannes Hudde, anno 1667 Civitatis Amstelodamensis Scabinus, anno 1668 Senator, et circa idem tempus etiam Athenæi curator factus, mox effecit, ut Rauis Philosophiæ Professor Amstelodamum Leida vocaretur, qua de re d'Orvillius infra dicit, p. 41. Consul factus est demum Huddenus in illa rei publicæ conversione, anno 1672. Inde autem vicies fungens eo munere semper promovendis Athenæi commodis intentus fuit; et erat ipse vir, doctissimus, præsertim mathematicis, neque indignus, qui Archimedes nostras diceretur Francio in Oratione xxiii., p. 308, et hinc d'Orvillio, l. c. Juvenis scripta ediderat mathematica, de Reductione Æquationum et de Maximis et Minimis; atque eum multa in mathema-

(§ 28.) Having premised thus much respecting the historical and traditional views held until a recent period on the subject we have been examining, it now devolves on me to offer the following translations of the inedited letters to which I have before referred, as having been so obligingly transmitted for publication.

The letters tell their own tale so well, that there will be no reason for departing from the rule I have considered it right to adhere to in my former papers—namely, to put the reader in as full possession as possible of facts, data, and collateral testimony, and to leave his judgment unbiassed by extraneous arguments or dogmatic assertions.—

LETTER I.

"The Hague, September 27, 1670.

"SIR AND BROTHER,—Your missive of yesterday has reached me to-day, with the document belonging to M. Jean Heufft annexed thereto; and I leave it to your judgment and discretion as regards the delay about the reimbursement of the portion recouped to Messrs. Wuytiers, on account of the great difference in bank money. But in case the probability of a fall in bank money be not considerably greater than that of a rise, it seems to me that the money of Messrs. Wuytiers should be paid them as early as possible; at least, I am disposed to think they should already be advised of a redemption being near, which notice it seems to me that politeness and propriety demand. It will also be agreeable to me that M. Abraham Alewyn's portion be redeemed in 6 months, and I shall then await fuller information that the aforesaid redemption has been effectually carried out.

"I return you enclosed herewith your obligation of 3,200 florins, the interest upon which of 128 florins I have received, and credited you therewith. I have also caused the Receiver-General Pauew to be informed that the interest upon it will, in future, be received by me, so as better to prevent the redemption; but I have not ventured to make the transfer of the obligation into my name, because I could not have affirmed with truth that it belonged to

ticis primum invenisse ipse testatus est Leibnitzius, qui anno 1674 Hollandiam invisens familiaritatem cum eo contraxerat. Illam autem scientiam suam Huddenus sæpe in utilitatem urbis patriæ adhibuit, ut in defæcendo per annum 1671, et seq. Amstela, quam operam ejus Francius celebravit dicta oratione et poematum, p. 243. Diem suum obiit 15th Aprilis, 1704, relictis plurimis scriptis mathematicis, quæ quominus absolveret ac vulgaret publica eum negotia prohibuerant. Scripta illa certum habeo adhuc alicubi condita servari, unde optandum est, ut aliquando in lucem proferantur."—(C. d'E.)

me as proprietor; but I hope that the aforesaid notification will have the same effect.

"I could very usefully employ here the money which you have still in hand, after the said two redemptions; and if I persist in my resolution to redeem the portion of M. Sylvester Heereman of 25,000 florins, falling due the 1st November proximo, I should wish for a like capital to be contracted for several years, at much about the same period, at the rate and at the conditions which are perfectly expressed in the accompanying memoir, as well as regards the subscribers as the brokers; to which I have also added two formulæ of obligations, which could be prepared for this purpose, filled up in full, with the exception of the name and quality of the subscribers, so that after the conclusion of the transaction there may not remain any misunderstanding as to the extent of the obligations.

"And if, contrary to my anticipation, such a contract should not suit, I beg you to have the same portion negotiated for twelve months at three per cent., upon the other formula not filled up, and added annexed hereto. Waiting for your answer in due time upon this subject, I conclude, and remain, &c. &c.

"To M. Jean Deutz."

"MEMOIR ABOVE REFERRED TO.

"To produce the accumulation of any given capital for minors or others, or to invest it for a certain number of years with a good and assured profit, a large sum of money is offered to be reinstated by a doubled capital at the end of 24 years; by the capital, and 76 per cent. gain in addition, at the end of 20 years; and, similarly, 62 per cent. profit at the end of 17 years; 53 per cent. at the end of 15 years; 40½ per cent. at the end of 12 years; or 33 per cent. at the end of 10 years.

"For perfect assurance of which, there shall be remitted as guarantee, and in pledge to the subscribers, a fifth more than the capital paid up, and this to be in settled obligations; and if it be for a somewhat long period, the said guarantee shall augment every 5 years by a same fifth of the original capital—that is to say, by exactly the fifth of the sum which shall have been remitted at first in obligations given in pledge; so that if the obligation be made for 24 years, one will have accumulated at the end of the 20th year a doubled capital in guaranteed obligations, and consequently the whole sum for reimbursement at the termination of 24 years.

"A similar proportion will be observed relatively to a smaller term of years, so that the subscribers of funds will always have in advance, in fixed and guaranteed obligations, a good portion more than they have furnished, or than they could lay claim to. And as to the broker's allowance, it will be calculated at the rate previously in use, viz., one per mille per annum, and will be paid in advance on the spot, with discount in the same proportion as the rate for the capitals paid up; so that the broker will receive at once, and in advance, 1,200 florins in ready money, if the value of the investment be 100,000 florins, and contracted for 24 years; if it be for 20 years, he will receive 1,136 florins; for 17 years, 1,050 florins; for 15 years, 980 florins; for 12 years, 854 florins; and for 10 years, 758 florins: and for greater or lesser sums in the like proportion.

Moreover, a large sum in life annuities is offered under guarantee and pledge, as above, with the promise that if the person on whom the life annuity shall be constituted survive to the expiration of 12 years complete, the holder of the title is to be granted another full capital, and at the expiration of 24 years complete, 3 capitals, with this condition added, that should the subscribers of funds wish to be recouped their capital at the end of the first 12 years (the person on whom the life annuity is granted being still living), the annuitant, or he that has been receiving the aforesaid capital in life annuities, will be held bound to reimburse it him, less the rebate or deduction of a sixth of the capital, to provide for the diminution of the value of the invested rent caused by the increasing age of the person on whose life the annuity is constituted; at the expiration of 24 years with deduction of $\frac{1}{6}$ of the whole, and moreover the $\frac{1}{6}$ of the remaining $\frac{5}{6}$, that is to say, the $\frac{11}{36}$ of the whole; at the expiration of 36 years or thrice 12 years, with deduction of $\frac{11}{36}$ of the whole, and in addition also the $\frac{1}{6}$ of the remaining $\frac{25}{36}$, that is to say, the $\frac{91}{216}$ of the whole; at the expiration of four times 12 years, or 48 years, with deduction of $\frac{91}{216}$ of the whole, and over above the same, the $\frac{1}{6}$ of the remaining $\frac{125}{216}$, that is to say, $\frac{661}{1296}$ of the whole; at the expiration of five times 12 years, or 60 years, the $\frac{1}{5}$ again above the aforesaid value; at the expiration of six times 12 years, or 72 years, similarly, and the $\frac{1}{4}$ of the remainder of the value in addition; at the expiration of 7 times 12 years, or 84 years, the same, and in addition $\frac{1}{3}$ of the remainder of the value; at the expiration of 8 times 12 years, or 96 years, in the same way, with $\frac{1}{2}$ of the

remaining value in addition; at the expiration of 9 times 12 years, or 108 years (if the life be still existing), in the same way, and $\frac{2}{3}$ besides of the remaining value; and in case of further life, $\frac{3}{4}$, $\frac{4}{5}$, &c.

"The power of redeeming the capital also remains constantly with the annuitant."*

LETTER II.

"The Hague, August 2, 1671.

"SIR,—Your esteemed missive of the last ult. has come to hand with the tables which accompanied it, and I feel myself bound to thank you heartily for the same, as also for the communication of the double question contained in your preceding letter.

"I have perfectly understood the estimation of the value of life annuities upon one life, computed from the life and death of 96 persons, included in the column for the age of 6 years, and I find it pertinent and conclusive; but you will oblige me by informing me whether the computation of the value of 19 florins 16 stuyvers and 9 pennings of life annuities upon two lives, has also been made according to certain cases of several life annuities granted upon two lives; or else whether it has been combined according to lot, or by some other method of drawing, or, in fine, whether you have computed the augmentation of 2 florins 12 stuyvers and 6 pennings by some certain calculation depending upon the primarily found value of the life annuity upon one life, and in what manner this calculation could be performed.

"But as there is a general persuasion that the life annuity upon two lives, at 17 years' purchase, is much more advantageous than that upon one life at 14 years' purchase; and that it may even be, that the life annuity upon two lives, if sold at 18 years' purchase, would be even then preferred to that upon one life at 14 years' purchase; as this might produce a notable advantage to the republic, it is, in my opinion, of the highest importance to leave people in this persuasion; therefore I have not divulged it to anyone except yourself, that according to my calculation (since

* There is a marginal note in De Wit's handwritng against the first part of this Memoir, with the computations checked by rule of three in each case two or three times over, by different abbreviations. The substance of the note is to observe that "Upon 100,000 florins there being paid annually to the broker 1 per mille, or the sum of 100 florins, consequently 2,400 florins for 24 years, which being reduced to present value (in the proportion first referred to, *i.e.* as to doubling of capital) gives 1,200 florins (200 : 100 :: 2400 : 1200); for 20 years, 176 : 100 :: 2000 : $1136\frac{4}{11}$ florins; for 17 years, 162 : 100 :: 1700 : $1049\frac{21}{81}$ florins; and so on, for each term of years mentioned in the body of the Memoir.

I remark that yours, upon two lives, is even lower still) the purchase upon one life at 14 years' purchase is more advantageous than that upon two lives at 17 years' purchase, and that is why I leave you to consider whether you do not judge it to be useful for the public good that this estimate should be absolutely hidden, and people left in their ancient persuasion, for the advantage of the State finances; because I am convinced, on this subject, that they will not be put in the track by a calculation made in round numbers, and probably no one will make a precise calculation for them; we may then act thus in every case and with a good conscience, so long a time as, when purchasing upon two lives, the country treats them still more advantageously than in the case of a revenue from an ordinary redeemable rent, at the usual rate.

"I submit myself besides in this respect to your better opinion and approval; and I remain he who is truly yours, &c.

"P.S. I will have copied for you, at the first opportunity, the great table of discount and of reduction to present value.

"To M. Johan Hudde, Councillor and Ex-Sheriff*
of the City of Amsterdam."

LETTER III.

"The Hague, 7th August, 1671.

"SIR,—On the 2nd instant I acknowledged receipt of your missive of the last ult., as well as of the table and the estimate which accompanied it, adding thereto, that I should have been glad to have been informed of the method which you have followed in the calculation of the value of life annuities upon two lives; and I shall be delighted to have your instructions on that head. In waiting for it, I hand you annexed a copy of the Table of Discount, which I promised you in my former letter, and with the help of which one may calculate, without much trouble, how much the life annuities in every class which you have extracted from the respective books have been worth in ready money to the annuitants.

"Since your departure I have thoroughly calculated ten different classes of lives, from the age of one year to ten years inclusive, and I find the same result as in the note enclosed.

"The number which you have recently proposed respecting the ratio between the chances of two players at (the game of) *quinque*

* *Oudt Schepen—Gallicè, Ancien Echevin.* Query—Ex-*Treasurer?*

novem agrees literally with the one which I had already calculated in that regard, and included in the note which was recently shown to you here; so that we may be mutually confident that there is no error in the computation. In conclusion, I remain, &c., &c.*

"To M. Johan Hudde, Councillor and Ex-Sheriff
of the City of Amsterdam."

LETTER IV.

"The Hague, 24th August, 1671.

"SIR,—Having, contrary to my anticipation, remarked in your notice (which you had conveyed to me on the 15th instant) that your computation upon the class of lives of the age of 7 years only brings out 15 florins 2 stuyvers 13 pennings as the value of one florin of annual life rent, upon the 77 lives constituting the aforesaid class and taken one with the other, I have had a large number of classes calculated, and a greater number of lives, and never in any class has the value been under 16 florins.

"After the closing of the Assembly of their Noble and Mighty Lordships, I calculated the aforesaid class with the extremest care, at first for terms of complete years and with the discount at interest of 4 per cent. proportioned thereto (and this in the same manner as all your calculations are performed), and I have obtained as the result, 15 florins 15¼ stuyvers, as I beg you to remark in the calculation annexed under No. 1; and having subsequently computed it in half-yearly terms, I have obtained 15 florins $18\frac{11}{100}$ stuyvers as the result, as you will remark in No. 2, enclosed herewith; and as it may as easily have happened that the annuitants, when they have reached the termination of their lives, and been registered for complete years, shall have died in the last six months of the year following as in the first six months of the same year, we ought, in order to estimate the matter with the utmost precision, to compute how much the said further value

* The note referred to is not copied in the minute.

The above short letter affords the most conclusive of proofs that De Wit's and Hudde's studies respecting annuities were entered upon consentaneously with or rather immediately consequent upon their attention being directed to the discoveries of the laws of chance or probability, exemplified in the then unpublished but already celebrated labours of Pascal and Fermat, on those laws applied to games of hazard; and which were the more familiar to *De Wit and Hudde* through the treatise of their countryman *Huyghens* (*De Ratiociniis* in *Ludo Aleæ*).

We may be sure it would have rejoiced the great Hanoverian Philosopher (whose words I quoted in my former paper) if he could have seen this direct illustration by De Wit of the truth of that favorite theory of his to which those words advert.

An explanation of the problem of the game of *Quinque Novem* will be found in the work of *Remond de Montmort*, p. 173.

amounts to, by presupposing that out of each even number, 2, 4, or 6, there die respectively 1, 2, or 3 lives in the last six months of their year of decease, according as the division may be conveniently made free from fractions; which having also done, I have then found that one florin of annual rent would have produced for each of the aforesaid 77 lives, taken one with the other, a value of a little more than 16 florins, as you will observe more in detail in the calculation herewith annexed and numbered No. 3.

This is what has induced me to have the 9 other classes also calculated, each with discount and in half-yearly terms; and the result has been found such as you will be so good as to remark in the note herewith enclosed, No. 4, and to observe that on one side or the other a slight mistake has been made in the classes of lives aged 2, 3, 8, and 9 years; but as I have not personally computed the latter classes, I should not venture to speak of them so positively as of the preceding class of lives of the age of 7 years, which I have myself calculated by all the methods above indicated; however, in case no error has been committed in the other aforesaid classes, all those classes, the one taken with the other, have each the value of 17 florins 9 stuyvers; to which must further be added 2 stuyvers for the augmentation arising from what, as above said, one may justly presuppose from there dying in the last six months of the year of decease as many lives as in the first six months. All these annuitants may then be presupposed to have enjoyed a half-year's more of annuity; so that they will, in effect, each have drawn 17 florins 11 stuyvers for the value of 1 florin of annual rent (in the case when they have been paid in half-yearly instalments).

"Your missive of the 9th instant reached me in due course. I thank you for it very sincerely, and remain, &c.

"To Johan Hudde, Councillor, &c."

N. B.—The notes (above referred to) numbered 1, 2, 3, and 4, are not annexed to the draft of this letter. The following memorandum forms a postscript:—

"I also remark, that in your table ascending to the age of 80 years, the last number is always taken a little too small, which progressively amounts to this much—that my table for complete years produces, for the 80th year, 2,304,980, whilst the same item in the computation of yours is only 2,304,848 or (*minus*) 123,* which cannot, however, cause but a very little difference in the life annuities."

* *Sic.*

LETTER V.

"The Hague, October 20, 1671.

"SIR,—Since your departure from here I have made some more mature reflections, both upon what you have communicated to me respecting the proportion found from experience in the mortality* of lives from year to year, and upon the method of calculating a life annuity upon *two lives*, which I have briefly explained to you; and, as regards the first subject, I remark (contrary to my expectation) that the equation of mortality from year to year may with confidence be defined as ascending from the age of 50 to that of 75 years; and it is found that, if one chooses several lives, aged 50 years, without inquiring whether they be then in a good or bad state of health—that is, taken promiscuously as their lives are then found to be—they die almost exactly (at least without any sensible difference) as follows:—

From 50 to 55 inclusive, $\frac{1}{6}$;
„ 55 „ 60 „ $\frac{1}{5}$;
„ 60 „ 65 „ $\frac{1}{4}$;
„ 65 „ 70 „ $\frac{1}{3}$;
„ 70 „ 75 „ $\frac{1}{2}$.

(And thus up to such time during each year, upon an equal number of persons; so that my conclusion, deduced from very natural and known principles, and which I have extended to 50 years, is not only neither applied and taken for too great a number of years, nor for too long a space of time; but it may be confidently applied, according to experience, for 70 years, and some years beyond, as from the age of 2 or 3 years up to that of 75 years.)

From 75 to 80 inclusive, $\frac{3}{5}$;
„ 80 „ 85 „ $\frac{2}{3}$;
„ 85 „ 90 „ $\frac{7}{8}$;
„ 90 „ 100 „ $\frac{1}{1}$.

"I have not yet made any research relatively to the preceding years in respect to application of the principles; but I will with pleasure communicate to you, in due course, the result of my investigations on that subject.

"In the meanwhile, I observe that you also compute the 50th year, reckoning from the age of 6 years—that is to say, to 56 years; and that, of 30 persons still surviving out of the 80, 5 die in the 5 following years, which only makes $\frac{1}{6}$ for that period;

* *Afsterven*—deaths, decrements of life.

whilst my experience, carefully made upon several lives, gives $\frac{1}{5}$ as the deaths for the same period, even in beginning one year sooner; similarly, also (according to your foregoing fixing of time), a life annuity invested upon one life of 50 years of age, without distinction of constitution or corporal complexion, would then have a value of 11 florins 7 stuyvers, being computed upon the table of complete years; whilst, after having had calculated several subjects of the same category, according to the actual deaths experienced, amounting in the aggregate to nearly 750 in number, I perceive that the most advantageous class does not exceed 11 florins $0\frac{1}{5}$ stuyvers; that the lowest, although it comprises 271 subjects, does not amount to more than 9 florins $11\frac{2}{5}$ stuyvers; and that, taken one with the other, the annuity is not above 10 florins $10\frac{1}{2}$ stuyvers; notwithstanding that being further calculated upon the table of half-years, as you have based it on lives of 50 years, the value exceeds by a whole florin that which experience has proved.

"As respects the method of calculating a life annuity upon two lives, such as I have forwarded to you, it is erroneous, because it depends, *inter alia*, upon the foundation that the probability of decease of one life, upon which the annuity is supposed to have been purchased, would be equally great in each of the 80 years; which is absolutely true upon the presupposition of your aforesaid principle, if the said life be considered by itself, and having no relation with another; but if this same life be placed in such case that it has to be compared with another, and which survives it, the same presupposition then becomes entirely false; because it is almost certain that in such case the aforesaid life will die in the first years, and almost impossible that he should chance to die in one of the last years, because, as respects dying in the first years, he would almost certainly be the survivor, since he is already placed in the supposition as being likely to die the first, to such a degree that in case the said life chance to die at the end of the first year, it is 79 to 1 against his being the first who dies; and in case of his happening to demise at the commencement of the last year, it is again 79 to 1 that he is the survivor; so that the case being already assumed that the said life be the survivor, the first and the last years are no longer in the least degree equal relatively to the day of his death; and consequently, also, we cannot base thereon any equal chance, as has, however, been established in the aforesaid estimate.

"I have therefore followed another method, which is annexed hereto, and which I submit to your examination, albeit, however,

that such method is founded upon your aforesaid presupposition; and as I am persuaded that the said presupposition attributes to the lives, towards the last years, more vitality than nature grants them, that is why also the life annuity on two lives calculated thereupon must be augmented a little too much in value. In finishing my letter I remain, yours, &c., &c.*

"To M. Hudde."

LETTER VI.

"22nd October, 1671.

"SIR,—I forwarded you yesterday a more detailed calculation respecting the value of the life annuity upon two lives; but although I look upon that method as correct, a mistake has nevertheless been made in the order of the items, each multiplied item having to be increased by the item in the table, which would augment the value discovered by about one stuyver; on which account I will shortly send you a revised Memoir, and I will also have recalculated the aforesaid value in another manner, subjected to rather larger multiplications, to see if all be in good agreement.

"To M. J. Hudde, &c."

LETTER VII.

"27th October, 1671.

"SIR,—Since the departure of my last letter of the 22nd, your two letters of the 21st and 22nd instant have respectively come to hand, with the table of life annuities calculated upon two lives, in the selected class of 96 lives all aged 6 years, and also the fuller demonstration of the provisional hypothesis; namely, that out of 80 young lives, about 1 dies annually. I feel myself bound to thank you most particularly for it, and likewise for the information respecting the error found in your calculation of the value of an annuity upon two lives, as estimated upon the aforesaid provisional hypothesis.

"I informed you in my last letter of the 22nd instant that I had found the value of an annuity upon two lives by another method, embracing rather longer multiplications; since then I have more maturely examined the same subject, and have besides so perfected the said method by the employment of several abbreviations, that I think it is at present one of the most general and easy rules which I imagine can be found in the nature of the thing, and

* N.B.—The calculations referred to are wanting.

applicable not only to the exact calculation (without loss of the least fraction of a penny) of the value of a life annuity upon two lives, but also upon 3, 4, 5, 6, or as many more lives as one may wish, which rule is briefly included in the annexed explanation, with the urgent request that you will try its application, and take an opportunity of communicating to me your sentiments thereon. Both the reason and the demonstration of the said method will assuredly present themselves without fail to your mind—to you who have already reflected upon the subject, and have so perfectly comprehended it—and which I would willingly enlarge upon, if one could put it as briefly into writing as one can concisely demonstrate it verbally and by ocular reference to the tables. However, if you think it worth the trouble, I will with pleasure respond to your wish upon the subject, and in that case would establish thereon an argument *à priori*, although I have found it *à posteriori*, like in almost all inventions.

"Following the aforesaid rule, the value of the life annuity upon 2 lives, computed according to your said provisional hypothesis of 80 lives, and taking the first to die during the year, has been found to be 20 florins 15 stuyvers $15\frac{864}{3125}$ pennings, which is a little more than $1\frac{1}{4}$ penning above the value communicated in your last letter, which approximates very closely, but ought not to differ at all if we had both operated with precision.

"I shall receive with pleasure the method you have promised me, and upon which the calculation is made according to the case of the aforesaid provisional hypothesis, whereby, and also by the further communication of your more exact estimates upon the said subject, you will singularly oblige him who is, and at all times will remain, yours, &c., &c.

"To the Sheriff Hudde."

"The Hague, 27th October, 1671.

The Memoir annexed to the above, and therein referred to, is as follows:—

"General method for accurately calculating the value of a life annuity, constituted upon 2, 3, 4, or upon 5 or upon as many more lives as may be desired, in the given or selected case of the decease of several lives, according as they have been successively found to have survived or died; or, according to a general and well-proportioned hypothesis, based upon the experience of ordinary mortality, so that if a life annuity constituted upon 2, 3, 4, 5 or more of the aforesaid deceased persons had been bought and sold at

the price of the aforesaid value which is sought, the buyer and the seller would have speculated with precisely the same advantage as though they had respectively bought and sold the exact value upon one life of the chosen or established worth of life annuities constituted upon one only of the aforesaid lives.

"Let there be given an average and well-proportioned case of the decease of several lives, as, for example, of 8 young lives (that number being given in order to avoid here too great a complication), and who are found to have lived as follows — the first to have become defunct 7 full years from the well-established date at which I suppose has been bought or invested upon each of the aforesaid lives a life annuity of 10,000,000 little pennings (*kleyne penninxhens*), making together one florin per annum; the second life 15 years; the third 24 years; the fourth 33 years; the fifth 41 years; the sixth 50 years; the seventh 59 years; the eighth 68 years; all complete years, as in the case of the first life; then this life annuity, calculated entirely for full years and for one of the aforesaid lives, taken one with the other, is found to have had a value of rather more than 17 florins $4\frac{2}{5}$ stuyvers, as is demonstrated in the subjoined calculation.

"It is now required to be known how much ought to have been paid, in the proper proportion, for a life annuity constituted upon 2, 3, 4, or 5 or more lives.

"Place the numbers, expressing the number of years* which each life respectively has lived, the one following the other in natural order, as hereunder; namely, the smallest number (which may also be 0) the first; the nearest to it, second; and so on to the end, as has been done hereunder in the before described case for the first line.

7	15	24	33	41	50	59	68
	1	2	3	4	5	6	7
		1	3	6	10	15	21
			1	4	10	20	35
				1	5	15	35
					1	6	21
						1	7
							1

If you now wish to ascertain the value of the life annuity upon 2 of the said lives, place unity, or 1, under the second of the numbers proposed, 2 under the third, 3 under the fourth, and so on to

* That is to say, for each life separately; therefore, if 2, 3, or even several lives have survived the same number of years, one must also arrange the number of their years twice, thrice, or more times, one beneath the other.—(De W.)

the end. If you wish to ascertain the value of the annuity upon 3 of the aforesaid lives, place unity, or 1, beneath the third of the numbers proposed, 3 beneath the fourth, 6 beneath the fifth, 10 beneath the sixth, and so on; namely, always the number formed by the cumulation (one upon the other) of 2, 3, 4, &c. of the numbers above employed in the estimate of the annuity upon two lives.

"And if you wish to know the value of the life annuity upon 4 of the aforesaid lives, place unity, or 1, under the fourth of the numbers proposed, 4 under the fifth, 10 under the sixth, 20 under the seventh, and so on; namely, in each case as great a number as is formed by the cumulation (one upon the other) of 2, 3, 4, &c. of the numbers above made use of in the calculation of the life annuity upon 3 lives; and so on, and in the same order, relatively to the life annuity upon 5, 6, 7, or more lives, as many as may be required, comprised in the case proposed or adopted.

"This preparation being then made, I say, as a general conclusion, that the required value of a life annuity upon 2, 3, 4, 5, or a larger number of lives, is rightly and exactly equal to the value of a life annuity upon one life of a class of as many lives as form, in the aggregate, the aforesaid numbers placed beneath or alongside, which lives have also respectively survived as many years since the purchase of the annuity as are indicated above or over against such numbers following that which has been established; namely, that the value of the life annuity upon 2 lives, in the aforesaid selected or proposed case, is rightly and precisely equal to the value of a life annuity upon one life of a class of 28 lives, of which one life has lived 15 complete years; 2, each 24 years; 3, each 33 years; 4, each 41 years; 5, each 50 years; 6, each 59 years; and 7, each 68 years; so that the value of the life annuity upon 3 lives, in the aforesaid case, is exactly equivalent to that of a life annuity upon one life of a class of 56 lives, of which 1 has lived 24 full years; 3, each 33 years; 6, each 41 years; 10, each 50 years; 15, each 59 years; and 21, each 68 years.

"That the life annuity upon 4 lives, in the case proposed, is exactly equal to the value of a life annuity upon one life of a class of 70 lives, of which 1 has lived 33 full years; 4, each 41 years; 10, each 50 years; 20, each 59 years; and 35, each 68 years. "And so on, consecutively, with reference to 5, 6, 7, &c. lives, as is constantly indicated by the subjoined numbers and the superposed years.

"The calculation of all this may likewise be effected by means of a simple addition, without multiplication, by an easy method, as

may be more precisely judged of in the annexed calculation; and when the numbers bear a continuous proportion to each other, or when they include the sums of numbers which are in a constant ratio to each other (as is found when we apply the above general rule to the hypothesis that in 80 years more or less, according to the constitution of the annuity, there dies in each year one person out of as many persons as there are years given), one may further find or make use of other abbreviations for the facilitation of the work.

Lives.	Lived, Years.	Value reduced to present worth.	Or upon 2 lives.
1	68	232,635,074	232,635,074 *
1	59	225,284,296	457,919,370
1	50	214,821,846	672,741,216
1	41	199,930,518	872,671,734
1	33	181,476,457	1,054,148,191
1	24	152,469,631	1,206,617,822
1	15	111,183,874	1,317,801,696
1	7	60,020,547	7) 5,814,535,103 †
		8) 1,377,822,243	4) 830,647,872
		172,227,780	207,661,968 ‡

Gives, upon one life, 17 florins $4\frac{2}{5}$ stuyvers.

And in the same way that by means of the 8 items of the annuity upon 1 life, the value has been found of the life annuity upon 2 lives, by adding the first 7 results, in the aforesaid manner, and dividing their sum by 28; so, by the 7 items of the estimate of the same life annuity upon 2 lives, is found the proportionate value of the life annuity upon 3 lives, by adding the first 6 results and dividing their sum by 56; and so on consecutively for the value of the life annuity upon 4 lives, by adding the first 5 of the 6 items resulting from the latter operation, and dividing their sum by 70; and so on consecutively to the end, as it has here been calculated."

(§ 29.) Before again adverting to the progress virtually accomplished in the labours of De Wit, we must briefly review the state

* Add to the first item of the first column, the second item; to the second item, the third item; and so on, to the seventh.

† This sum includes 7 times the first item, 6 times the second, 5 times the third, 4 times the fourth, 3 times the fifth, twice the sixth, and once the seventh; *ergo*, according to the rule, let it be divided by 28, and it gives the value of the annuity upon two lives; viz., 20 florins $15\frac{3}{10}$ stuyvers.‡

The above two notes are from De Wit.

of popular information on the subject of life annuities, as it existed at the period we are considering; and we must moreover bear in mind, that in endeavouring to ascertain the views popularly entertained upon it in his country in the seventeenth century, we are searching for the then highest general standard of intelligence upon the matter; and we need no better proof of this than the fact that the example of Holland in *all* financial, commercial, and economical operations, was most studiously enjoined for the imitation of this country by the first authorities of that time—by such men, for instance, as Child, Culpeper, Petty, and others of their stamp.

For our present purpose a glance at certain pamphlets which appeared in the years 1670 and 1671 (and of which I annex the titles*) will perhaps be found sufficient. These pamphlets—7 in number, and which refer to the towns of Kampen, Middelburg, and Groningen—are fair specimens of the schemes which the Dutch municipalities employed for raising capitals by the grant of life annuities.

One of the points of information they convey is, that it had long been the practice in Holland for life annuities to be granted, to nominees *of any age,* in the constant proportion of double the rate of interest allowed on stock; that is to say, if the towns were borrowing money at 6 per cent., they were willing to allow 12 per cent. by way of life annuity; if at 5 per cent., the life annuity granted was 10 per cent.; and so on. The States of Holland and West Friesland seem not to have held out quite such favourable terms to life annuitants. De Wit, in the commencement of his Treatise, refers to their then rate of charge being 14 years' purchase, whilst redeem-

* I. Vertoogh, en Calculatie, waer mede, klaer en blijckelijck wort vertoont, en aengewesen, de Beneficien en voordeelen, die uyt dese Lyf-Renten by Overlevingh, in diervoegen, als by de Stadt Kampen werden opgenomen, soo wel voor de Opnemers, als voor de Gevers, staen getrocken en genooten te werden. Gestelt in vergelijckinge met Los-Renten tegens 4 ten hondert, en ordinaris Lijf-renten tegens 8 ten hondert. *Small 4to. Amsterdam,* 1670. 8 pp.

II. Naerder Conditien en Voorwaerden waer naer de Heeren Burgermeesteren, Schepenen en Raedt der Stadt Kampen hebben geresolveert op te nemen een somme van hondert duysent guldens op Lijfrenten by Overlevingh. Te weten; op een Collegie of Compagnie van 400 Persoonen, tegens 4 per cento's Jaers: Oock de versekeringh die voor de prompte betalinge sal werden gegeven; als mede de ordre die in't administreren, en betalen van de Lijf-renten sal werden geobserveert. *Small 4to. Amesterdam,* 1670. 8 pp.

III. Lyste van het Collegie ofte de namen der Persoonen, op wiens leven de Heeren Regeerders der Stadt Campen, hebben opgenomen ten behoeve ende tot laste van haer gemelte Stadt, door t' Administratie van Jacob van Dael, gesworen Makelaer der Stadt Amsterdam, hondert duysent Caroli guldens, ofte veertigh duysent Rijcxdaelders, op lijfrenten by Overlevingh, Gesloten den primo November Ouden, ofte den elfden dito Nieuwen—stijl, Anno 1670. De Gecommitteerde van't Collegie, Adriaen van Loon, Isaac Jan Nys, Joost de Smith, Johan van Beuningen. *Small 4to. Amsterdam,* 1671. pp. 16.

IV. Conditien en Voorwaerden waer naer de Heeren Burgermeesteren ende Raedt tot Middelburg in Zeelandt, hebben geresolveert, te doen verhandelen, &c. Een Capitael

able annuities were at 25 years' purchase. The state life annuity was consequently 1½ year's purchase dearer than the ordinary rule would have given. This, and other remarks in De Wit, to some extent warrant the inference that experimental investigation or observation had previously been made of the financial or mortality results of such transactions.

A favourite financial plan of that time was the raising of funds by the grant of survivorship annuities on the Tontine plan. An association, consisting of a given number of lives or nominees, sometimes with, and at other times without, stipulation as to age, was formed; each member subscribing an equal sum, to be paid into the coffers of the contractors, who guaranteed the payment of interest on the whole amount until the extinction, by death, of the entire association,—the survivors from year to year, and eventually the last survivor, enjoying the annual proceeds, but without final restitution of capital.

The advantages to those who raised funds by such means are too manifest to require referring to, but it will not be uninteresting to give, from the pamphlets numbered I. to III. in the preceding note—(and which, as well as the others, may be unique copies),—an example of the attractive way in which these transactions were brought under the notice of the public, and of the ingenious method whereby comparative and assumed possible results were tabulated for the benefit of discerning subscribers.

The following is a translation, with an abridgment of the figures, of the scheme for the town of Kampen, dated 1670. It will be sufficiently intelligible to the readers of this paper, so that explanations can be conveniently spared.—

van hondert twintigh duysent guldens by Overlevinge tegens 4½ per cento in't Jaer. Ende dat op het Leven van een Collegie of Compagnie van 240 Persoonen. *Small 4to. Amsterdam*, 1671. pp. 8.

V. Conditien en Voorwaerden waer naer de Heeren Burgermeesteren en Raedt in Groningen hebben geresolveert, te doen negotieren, &c. Een Capitael tegens 4 per cento van vijf duysent ses hondert en vijf-en-twintigh guldens jaerlijcksche Lijfrenten by Overlevingh. En dat op het Leven van een Collegie ofte Compagnie van 500 Persoonen, alle van ongelimiteerden Ouderdom. *Small 4to. Amsterdam*, 1670. 8 pp.

VI. Vertoogh en Uytrekeningh, waer mede Klaer en duydelijck wort betoont en aengewesen, dat de Lijf-renten by Overlevingh, invoegen als onlanghs voor de Stadt Campen, ende nu noch tegenwoordigh voor de Stadt Groningen, en andere Steden zijn ende werden genegotieert; voor de Contribuanten ofte Inleggers, better en voordeeliger zijn, als ordinaris Lijf-renten tegen 8, ja selfs tegen 10 ten hondert. Als mede, Dat die te prefereren zijn voor de Collegien, die hare Capitalen aenleggen in Actie op de Oost-Indische Compagnie. *Small 4to. Amsterdam*, 1671. pp. 20.

VII. Conditien en Voorwaerden Waer naer de Heeren Burgermeesteren en Raedt in Groningen noch hebben geresolveert, te doen negotieren en opnemen, &c. Een Capitael van hondert en tien duysent guldens, op Lijfrenten by Overlevingh, tegens 5 per cento's Jaers En dat op het Leven van een Collegie ofte Compagnie van 200 Persoonen, alle van den Ouderdom van 25 Jaren en daer boven. *Small 4to. Amsterdam* 1671. pp. 10.

"CALCULATION OR DURATION-OF-LIFE-RECKONING,

"*From which to find, and have clearly before one's eyes, the remarkable profits* which may be drawn and enjoyed, by the purchasers or investors, from life annuities by way of survivorship, in a college or company consisting of a number of 400 persons, aged one year and upwards, at 4 per cent., calculated on the basis that from 1 to 60 years, in each 12 years, the half of the number survive, and thenceforward, from 60 to 66 years, in each year one, and from 66 years to 76 years one every 2 years, and the last to 80 years; and placed in comparison with redeemable rents at 4 per cent., and ordinary life annuities at 8 per cent., as is more fully set forth in the annexed demonstration respecting the undertaking by the city of Kampen.

"Column No. 1 indicates the years.

"No. 2, the redeemable rents at 4 per cent. upon 250 florins, with the capital added up for each year.

"No. 3, the ordinary life rent at 8 per cent. upon 250 florins, all years added together.

"No. 4, the augmentation, or how much the life annuity is elevated by means of survivorship in each year.

"No. 5, how much per cent. the life annuities produce each year by means of survivorship.

"No. 6, the number of persons who, from the age of 1 to 60 years, in each 12 years, and thenceforward for each year, up to the age of 80 years, are assumed to remain still in existence.

"No. 7, the yearly life rent by survivorship upon 250 florins of capital added together for every year."

N. B.—The Table above referred to is printed in the original, *in full* for each of the 80 years; but the Abstract annexed in the opposite page will answer every purpose of information upon the tenor of the scheme.

Amongst the pamphlets before quoted is one containing a complete list of the names of the 400 nominees of the Kampen Tontine. They seem to have been all, or nearly all, under age, and many were probably in the first years of infancy. The names of the parents are given; and, with the single exception of "Charles II., King of Spain and the Indies," the lives are those of residents in Holland,—(in frequent cases 5, 6, or 7 of a family)—and include the children of many of the municipal authorities, clergymen, and officials, and some domestic servants.

The

1	2	3	4	5	6	7		
Year.	Redeemable Rent at 4 per Cent. upon 250 Florins.	Ordinary Life Annuity at 8 per Cent. upon 250 Florins.	Augmentation per Cent.	Rent per Cent.	Persons.	Life Annuity by Survivorship at 4 per Cent. upon 250 Florins.		
	Florins.	Florins.				Flor.	Stuv.	Pfen.
	250				400			
	10							
1	260	20		$4\frac{1}{3}$	..	10	8	9
	10	20				10	16	9
2	270	40		$4\frac{1}{3}$	..	21	5	2
	10	20	$\frac{1}{3}$			11	5	0
3	280	60		$4\frac{1}{2}$	..	32	10	2
	10	20				11	13	3
4	290	80		$4\frac{2}{3}$	..	44	3	5
.	.	.	.	.	.		.	
12	370	240			200	172	3	1
	10	20	$\frac{1}{2}$	$8\frac{1}{2}$	..	21	5	0
13	380	260				193	8	1
.	.	.	.	.	.		.	
24	490	480			100	428	15	12
	10	20	1	17	..	42	10	0
25	500	500				471	5	12
.	.	.	.	.			.	
36	610	720			50	1,142	1	13
	10	20	2	34	..	85	0	0
37	620	740				1,227	1	13
.	.	.	.	.			.	
48	730	960			25	2,568	14	8
	10	20	$4\frac{1}{3}$	$68\frac{1}{3}$	..	170	16	9
49	740	980				2,739	11	1
.	.	.	.	.	.		.	
60	850	1,200			12	5,462	0	2
	10	20	$12\frac{1}{12}$	$145\frac{1}{11}$	11	363	12	12
61	860	1,220				5,825	12	14
.	.	.	.	.	.		.	
65	900	1,300			6	7,741	10	5
	10	20	$38\frac{8}{21}$	$266\frac{2}{3}$		666	13	5
66	910	1,320			6	8,408	3	10
	10	20		$266\frac{2}{3}$		666	13	5
	920	1,340				9,074	16	15
.	.	.	.	.	.		.	
74	990	1,480				17,341	4	1
	10	20		800	2	2,000	0	0
75	1,000	1,500				19,341	4	1
	10	20	800	1,600	1	4,000	0	0
76	1,010	1,520				23,341	4	1
	10	20		1,600	1	4,000	0	0
77	1,020	1,540				27,341	4	1
	10	20		1,600	1	4,000	0	0
78	1,030	1,560				31,341	4	1
	10	20		1,600	1	4,000	0	0
79	1,040	1,580				35,341	4	1
	10	20		1,600	1	4,000	0	0
80	1,050	1,600				39,341	4	1

The pamphlets adduce several very apposite reasons for recommending such methods of investment as worthy of the consideration and patronage of the prudently economical, and as admirably suited to the wants of those who had to provide for the after-lifetime of young families. We may readily understand that such schemes presented but an imperfect substitute for the important social benefits arising from Life Insurance Companies; but at the same time, and viewing the matter as compared with the practice of the present times, it may well occur to us to inquire whence it has arisen that in England we have such strong prejudices against *Tontine Associations*,—based, perhaps, on the assumed *rationale* that they are too selfish and speculative to be encouraged,—and this, too, when such associations as Burial Clubs are tacitly countenanced,—to the detriment of the morality of our labouring population, and sometimes to the promotion of the worst phases of human nature.

To return, however, from this digression;—I may mention that my desire in quoting the foregoing Table of Computations was to show that the idea of a life table, arranged in the form of the number surviving to a given age out of a specified number living at any age, originated, roughly though it may have been, in these Tontine annuity schemes. The projectors in their announcement state—(with reference to the column No. 6 of the Table)—that they are aware, that anything like a precisely accurate calculation of the proportion dying out of a given number is not attainable, but "the assumed numbers had been framed upon a new elaborate scrutiny and observation, and there was no ground for assuming that the results to be experienced would range either below or above the anticipated number of survivors."*

(§ 30.) The state of information on the subject of life annuities was thus of a very imperfect and neglected kind at the period when it was taken up and made a theme of correspondence and study by De Wit and Hudde. They had to ascertain facts, deduce results, and create a method of computation; and after the oppor-

* We need not, of course, take this statement of the Tontine projectors as to their *calculations*, except with the "grain of salt," with which experience tells us we must season our belief in worldly matters; but nevertheless the fact of the remark existing in a paper getting on for two centuries old is worth some notice.

I should also mention, in passing, that in the pamphlet respecting the Groningen plan (see No. VI. in last note) the credit of the invention is honestly and properly given to the "sagacious," or more literally "sharp-witted" Italians, and the statement is further made of its having been but recently introduced into Holland ("eerst by de Scherp-sinnige Italianen uytgevonden, ende nu onlanghs door ons op de Hollandtsche wijse geschickt en in't werck gestelt").

N.B. It would be desirable to ascertain whether previous Tontine annuity schemes, as, for instance, those instituted by *Tonti*, in France or elsewhere, and prior in date to 1670, include any tables assimilating to that quoted in this paper.

tunities now offered of verification of this statement; and which are so amply presented in the letters from De Wit to Hudde, edited for the first time in this paper, it would be a work of supererogation to introduce much further detail.

Whether the facts were correctly scheduled, or rightly extracted, arranged, and certified, is a question which it would be impossible to solve; but we are not on that account justified in any doubt that experimental observation and collection of the indications of mortality at various ages, and in different classes of lives, were the principles in which the acuteness of De Wit and Hudde recognized the only true foundations for their labours.

The Treatise (or rather, Report) presented to the States was avowedly on the basis of approximative presuppositions; it would not, therefore, be fair to suppose that even De Wit himself intended it *practically* for more than an exemplification of a correct mode of applying the doctrine of chances to the calculation of life contingencies, and as a means of enforcing upon the States that he had ground for thinking it unwise on their part to grant the rate of annuity which they proposed, and quoted in their resolution of the 25th April, 1671, upon a negotiation of one million of florins by life annuities at 14 years' purchase upon one life, and 17 years' purchase upon two lives.

In following out some concluding researches on this point, I find that there was a Supplement appended to the Treatise of De Wit, and of which it will be necessary to give a translation in full, affording, as it does, the most important testimony as to his examination of the actual results of mortality experience amongst annuitants. It is as follows, and is well worthy of perusal:—

"SUPPLEMENT.

"As daily experience clearly proves that a great many persons are neither disposed nor competent to apply their judgment in such a manner to a complicated although unfailing course of reasoning, as fully to understand its force and the conviction it carries, and as with such persons examples have greater influence than reasonings of the kind, I find it incumbent on me here to add, for fuller satisfaction, that since the proof of the foregoing demonstration I have had very carefully extracted from the registers of your Lordships *some thousands of cases* of persons upon whose lives annuities have been purchased, with the memoranda up to the last due-dates to which the life annuities have been paid to each; and after a careful estimate that the respective annuitants have drawn upon each life,

in ready money, at 4 per cent. per annum discount, the same value in half-yearly instalments as in rents, from the time of purchase to the last day of the aforesaid due-dates inclusive, I have found that the said rents, invested on a fair number of young lives (as, for example, one hundred or thereabout), have, taken one with the other, always produced to the annuitants in ready money, from the time of purchase, a value of more than sixteen florins of capital arising from one florin of annual rent; that is to say, each florin of rent which they have successively drawn upon the aforesaid lives, all reduced to ready money, at the discount of 4 per cent. per annum, and for as long a time as each half-year of rent has had to be paid since the purchase, has invariably produced upwards of sixteen florins; so that, this being calculated upon considerably more than a hundred different classes, each class consisting of about one hundred persons, it has not been found in any one instance that the aforesaid rents which had been drawn at the above discount had attained less than sixteen years' purchase, but they were frequently much higher, even up to eighteen years' purchase. Thus one finds with wonderment, that in practice, when the purchaser of several life annuities comes to divide his capital which he intends to invest upon several young lives—upon ten, twenty, or more—this annuitant may be assured, without hazard or risk of the enjoyment of an equivalent, in more than sixteen times the rent which he purchases. All these particular calculations can, if needed, be demonstrated to your Noble and Mighty Lordships by him who is, and all times will be,

"Your Noble and Mighty Lordships'
"Very dutiful Servant,
(Signed) "JOHAN DE WIT.

"The Printer to your Noble and Mighty Lordships will print the aforesaid calculation and demonstration, some copies of which will be remitted in course to the members." *

(§ 31.) De Wit's system of computing an annuity value required only a consideration of the probability of a person aged x years dying at the age of $x+1$, $x+2$ . . . to $x+z$ years. The expression,

* This sufficiently accounts for the rareness of the work in its separate form as a Report or Treatise. The members of the Council of State were few in number, and we are not aware that they had any incentives for preserving a paper which to them possessed only a passing interest. Should a copy ever be met with, it will be well to look to the paging, as it may either be complete in itself or run on consecutively with the paging of the other Resolutions. The Printer was Jacobus Scheltus, typographer in ordinary to the States.

$$\frac{l_{x+\overline{n+1}}-l_{x+\overline{n+2}}}{l_x},$$

or the probability of a life aged x surviving n years or half-years, and then dying in the $(n+1)$th year or half-year, can be correctly traced in his calculation; the course of which may be symbolized in our most elementary notation as:—

$$\left(\frac{l_{x+1}-l_{x+2}\cdot\frac{1-(1+i)^{-1}}{i}}{l_x}+\frac{l_{x+2}-l_{x+3}\cdot\frac{1-(1+i)^{-2}}{i}}{l_x}\right.$$
$$\left.+\ +\ \ldots\ \frac{l_{z-1}-l_z\cdot 1-(1+i)^{-z-1}}{l_x}\right)=a.$$

This formula is identical with the fourth method of *Tetens* (described in Volume I., p. 9, of the *Assurance Magazine*): viz., in the Schleswig Professor's Notation,—

$$\Delta^{\underline{1}}\mathrm{A}\int\frac{1}{r}+\Delta^{\underline{2}}\mathrm{A}\int\frac{1}{r^2}+\Delta^{\underline{3}}\mathrm{A}\int\frac{1}{r^3}++\Delta^{\underline{z-1}}\mathrm{A}\int\frac{1}{r^{z-1}}=\mathrm{A}\lambda\bar{a}.$$

When De Wit observed that it was as likely that a man should die in any one half-year as in any other half-year of the first 100 half-years of the first period, it is not at all in evidence that he either implied or was considering the probability of a person who *had attained an* age of $x+n$, $x+\overline{n+1}$, to $a+\overline{z-1}$ years, dying in the $x+\overline{n+1}$, $x+\overline{n+2}$, to $x+z$th year. On the contrary, this was not required by his method, and the hypotheses, presuppositions, and comparisons of mortality proceeded on what we may call a formula of antecedent probability, that a life, now aged x, should *survive to the age* of $x+n$, $x+\overline{n+1}$ to $x+\overline{z-1}$ years, and *then die* in the $x+\overline{n+1}$, $x+\overline{n+2}$ to $x+z$th year.

This will afford a full justification of many passages in De Wit's Treatise, and particularly as to his numerical comparisons of decrements at the various ages; and although he certainly has several ambiguities of expression (which, however, may be greater in the translation than in the original), we may nevertheless maintain the opinion, that the valuable and distinguishing marks of progress through the whole of his instructive and important Treatise more than counterbalance its apparent deficiencies in occasionally not distinguishing between the shades of difference implied in the terms "living to," "surviving," or "dying in" specific years of life—terms which are obvious enough to a modern reader, and would, in all likelihood, have been so to De Wit, had it fallen to his province to pursue his researches further into the theory of

life contingencies. The letters here published will prove that at least he had both the industry and the will to do so. The last Memoir, in which he attempts to ascertain a method for the computation of the value of an annuity on the life of the longest survivor of two, three, or a greater number of lives, falls however far short of the object it was erroneously supposed to have attained, for such a calculation involves more complex probabilities than could be imagined or solved in the course of his reasonings, such as we see them in the essay to apply the combinatory formula, or arithmetical triangle of Pascal, to the problem.

We must concur in regretting that some of the computations referred to in the letters to Hudde are wanting, and that Hudde's correspondence and papers are to all appearance lost. This much, however, is fully proved,—that De Wit's chief and earnest endeavour, was to indoctrinate, for the advantage of his fellow citizens and the State, some *correct method* for deducing estimates of value from the ever-fluctuating indications presented in the data of the mortality experienced in various classes of lives. In pointing out such a method he was by no means unsuccessful; and, in reviewing the words of his Treatise, we must not lose sight of its being a State paper,—intended to be made plain to a legislative body,—and not to be elaborated in the style of a dissertation written for purely abstract scientific purposes.

It is no discredit to De Wit and Hudde that, in the infancy of the science of probabilities, and at a time when its language was but just forming, they should have fallen into some contradictions when they came to apply presuppositions or postulates as to the relative mortality at various ages. We are not called upon to criticise these minutely, because, under the peculiar circumstances adverted to, such a standard of measurement would hardly be fair. Rather let us concede that the then novel and ingenious views, and the many germs of truth contained in De Wit's Treatise and other labours on the subject of life annuities, did honour to his discrimination as a mathematician, and to his judgment as a statesman; and that he may be considered as the first who perceived that a new-found science, which was but beginning to attract the attention of philosophers of his day, could be applied not solely to the investigation of the hazards of players at ignoble games of cards and dice, but also to the business of life and to the good of the commonwealth.

F. H.

London, 1*st December*, 1852.

An Account of the Insurance Companies in Austria. By S. Alessandro Daninos, *Sec. Gen. of the Riunione Adriatica di Sicurtà in Trieste.*

[Read before the Institute of Actuaries, 29th November, 1852, and ordered by the Council to be printed.]

A.—Life Assurances, Provident Funds, &c.

I. *Wiener Allgemeine Wittwen und Waisen Pension Institut.* (General Annuity Fund for Widows and Orphans in Vienna.) —This establishment, founded in 1823 under the patronage of Prince Schwarzenberg, has for its object to insure annuities to the widows and children of the subscribing members who happen to die at least three years after their admission into the Society. The widows are pensioned until their death; the children until the age of 20.

The pensions are divided into three classes; the amount of each pension is dependent on the capital possessed by the Society. The maximum of the pensions is, however, fixed at £60 for the first class; £30 for the second class; and £15 for the third class.

The subscription may be made—

1. By a single payment at the time of admission, the amount of which is regulated according to the age of the subscriber, that of his wife, and to the class to which he wishes to belong, in accordance with a scale annexed to the statutes.

2. By an annual payment, fixed at £3. 4*s*. for the first class; £1. 12*s*. for the second class; and 16*s*. for the third class.

We refer for the remainder to the statutes of the Company.

From the Annual Report of 1850, and the prospectus, the following results appear:—

a. That the number of subscribers amounts to 1,989.

b. That the annual pensions are 618.

c. That the Society possesses a capital of £135,506.

d. That the pensions granted from the establishment of the Society until the end of 1850 amount to the sum of £194,562.

e. That the amount of each pension has been fixed for the year 1851 at £40 for the first class; £20 for the second class; and £10 for the third class.

This Society is especially remarkable for the extremely moderate expenses of management, which scarcely exceed £300 per annum. The greater part of the labour is gratuitously performed by the directors and the members of the committee; the offices

are situated in Prince Schwarzenberg's palace, and kept at his own expense; and there remain therefore but the salaries of two or three clerks to pay.

II. *Allgemeine Versorgungs Anstalt in Wien.* (General Provident Fund in Vienna.)—This institution was founded in 1824 by the Board of Management of the Savings' Bank in Vienna, by whom it is still conducted.

It has for its object the formation and management of the Mutual Association for Life Annuities, with partial alienation of the capital, according to the plan set forth by the statutes.

The subscriptions were, until 1847, of considerable amount; but since then the system of operations was the object of severe criticism from several of the subscribers; complaints were even addressed to the Ministry, who instituted a commission, whose duty was to examine them, and to propose the necessary reforms. The discussions which took place in this commission, and the conclusions which resulted therefrom, are contained in the Collection of the Minutes (*Procès Verbaux*), and in the draft of the new statutes.

The Report, published in 1851 conjointly with that of the Savings Bank in Vienna, shows that the total of the subscriptions, independently of payments already made, consisted, on the 31st December, 1850, of—

For the classes for the years	1825–1847 . .	£948,457
„ „	1848–1850 . .	36,465
	Total . . .	£984,922

III. *Assurance Company of Milan.*—This Company was founded by shares in Milan, in the year 1826, with a capital of £200,000—£120,000 for the life assurance department, and £80,000 for the fire insurance department.

The instalment paid down is 20 per cent. on the amount of each share. The assurances are for guaranteed sums at fixed rates of premium, according to the printed tables. The assurances upon life are, up to the present time, of small amount. The last Report gives the following results, on the 31st December, 1839:—

	£
Sums assured in case of death	33,523
Reserved premiums for the same	9,206
Funded capital for life annuities	111,453
Life annuities to be paid yearly	11,328
Profits in reserve	6,930

IV.—*General Assurance Company in Trieste.*—This Company, which had formerly the name of *Assicurazioni Generali Austro-Italiche,* now that of *Assicurazioni Generali,* was founded at Trieste in 1830. The Company effects insurances of fixed sums guaranteed by the shareholders, against risks by fire, maritime and inland navigation, transport of merchandise by land; against hail; and, lastly, assurances on the life of man.

The capital is £200,000, 10 per cent. of which is paid down in cash. Half of the said capital is specially appropriated to the life assurance department. The conditions on which this last branch of assurance is carried on are detailed in full in a pamphlet which shows the particular advantages which the Company offers to the assured; and it is especially to be remarked that it has just introduced in the whole life assurances the following new regulations:—

1. A new table has been prepared, by which the assured, under 51 years of age at the time of their insuring, may participate in 75 per cent. of the proportionate part of the profits resulting from these insurances.

2. The assured who have reached 80 years of age are exempted from the payment of all further annual premium, and receive the sum assured even in their lifetime, as soon as they have accomplished their 85th year.

3. Another special table has been adopted, by which the assured are allowed to pay only half of the annual premium, independent of the interest of 4 per cent. per annum on the other half. The accumulated amount of the half of the premium not paid down is deducted at the time of payment of the sum assured.

The Company has also undertaken the management of mutual insurance classes, with benefit of survivorship (according to the Tontine system), guaranteeing the interest of 4 per cent. per annum, subject to a commission of 5 per cent. on the amount of subscriptions.

The analysis of the account for the year 1850, and the report which accompanies it, give the following results:—

a. Assurance in case of Death.

	£
Amounts assured:—	
Sums payable at the death of the assured . .	469,927
Life annuities to be paid to a nominee after the death of another nominee	9,240
Annual premiums	24,855
Premiums in reserve for the above assurances . .	51,423
Profits in reserve	10,564

b. Life Annuities.

Annuities payable	16,962
Capital reserved for the same	131,542
Profits reserved according to the division of 1849	5,986

c. Assurances of Deferred Sums.

Sums assured	96,062
Premiums already funded and reserved	35,512
Annual premiums receivable	1,932
Profits in reserve	776

d. Mutual Assurance Classes (Tontine), according to a more recent account.

Total amount of the subscriptions realized on the 31st December, 1851	13,872

The most striking peculiarity in the numbers above reported is the proportion between the life annuities payable, and the capital reserved to provide for them; the result will be, in fact, an average rate of annuities of nearly 12·90 per cent. per annum—a rate which appears to be extraordinarily high, and would lead us to suppose that the average age of the assured at the end of 1850 was about 70 years, which appears hardly probable, or else that those assurances had been effected at rates still higher than those—already very high—fixed by the tables.

V. *Allgemeine Wechselseitige Capitalien und Renten Versicherungs Anstalt in Wien.* (Mutual Assurance Company for Life Assurances and Annuities in Vienna.)—This Company is, as the title indicates, based on the mutual principle. It was founded in the year 1839, and the assurances are divided into six classes; viz.—

1. Assurances of sums in case of survivorship.
2. „ „ payable on death.
3. Life annuities, immediate or deferred.
4. „ payable after the death of a nominee.
5. Endowments in favour of minors; or life annuities, payable after the death of a nominee until another nominee has attained his twenty-fourth year.
6. Life annuities increasing by the accumulation of interest, with partial alienation of capital.

The conditions which regulate these various classes of assurance, and the rates of premium, are contained in the statutes of the Company. The most remarkable condition is, that in the assurances payable on death the insured are submitted to one year's trial—that is to say, that the sum assured is paid only if the death occurs after the expiration of the first year of assurance.

It is owing to this restriction, to too excessive strictness in the selection of the lives, and perhaps also to want of activity on the part of the management, that the little progress which this Company has hitherto made is to be attributed, as the Company is one which ought not to have failed of success.

Its position on the 31st December, 1850, shows the following totals :—

	Sum assured. £	Premium fund. £
First class . .	5,208	2,322
Second „ . .	143,984	17,521
Third „ . .	1,044	8,256
Fourth „ . .	1,105	2,836
Sixth „ . .	.. ....	12,775
		£43,710
Reserved funds		5,510
Total amount of funds belonging to the Company		£49,220

VI. *Azienda Assicuratrice in Trieste.*—This Company, established about thirty years ago in Trieste for fire insurances, and for inland and for maritime navigation, with a nominal capital of £150,000, has just increased it to £200,000, and undertaken besides the business of life assurance, as well as that of granting life annuities at fixed premiums.

The conditions and the rates of premium are contained in the prospectus.

This Company grants also to individuals, who have not reached their fiftieth year, and who contract an assurance for whole life, the cessation of the annual premium at eighty years of age, and the payment of the sum assured after they have accomplished their eighty-fifth year.

In the review which we have just made, we have abstained from criticising the premiums and the conditions of insurances adopted by the various establishments: this analysis requires scientific knowledge, which we are far from possessing; and we therefore leave it to any one of the learned mathematicians who constitute the Institute of Actuaries, who may be inclined to undertake that labour.

We have, however, considered it useful to show in the following table the rates of premium of the Austrian Companies for the two principal branches, namely, for life insurances and for life annuities.

TABLE I.—*A Comparative Table of the Rates of Premium of Life Assurance Companies established in Austria.*

A. ASSURANCES PAYABLE ON DEATH (WHOLE LIFE).					B. LIFE ANNUITIES.				
Annual Premiums for 100 *Florins.*					*Life Annuities for a Payment of* 100 *Florins.*				
Age.	The Milan Company.	Assicurazioni Generali.*	Mutual Company of Vienna.	Azienda Assicuratrice.†	Age.	The Milan Company.	Assicurazioni Generali.	Mutual Company of Vienna.	Azienda Assicuratrice.
15	1 80	1 65	..	1 64	15	5 34	5 66	5 11	5 63
16	1 85	1 70	..	1 68	16	5 37	5 69	5 14	5 66
17	1 89	1 74	..	1 72	17	5 40	5 72	5 18	5 69
18	1 94	1 80	..	1 77	18	5 45	5 74	5 21	5 72
19	1 99	1 84	..	1 82	19	5 47	5 78	5 23	5 75
20	2 04	1 89	1 78	1 87	20	5 50	5 82	5 27	5 78
21	2 08	1 93	1 82	1 92	21	5 53	5 87	5 30	5 81
22	2 13	1 98	1 88	1 97	22	5 56	5 90	5 33	5 84
23	2 18	2 02	1 93	2 02	23	5 59	5 94	5 36	5 87
24	2 24	2 08	1 98	2 07	24	5 63	5 95	5 39	5 90
25	2 29	2 14	2 05	2 12	25	5 66	5 96	5 43	5 93
26	2 34	2 19	2 11	2 17	26	5 69	5 99	5 46	5 97
27	2 40	2 25	2 18	2 22	27	5 73	6 03	5 49	6 01
28	2 45	2 30	2 25	2 28	28	5 77	6 07	5 53	6 05
29	2 51	2 36	2 32	2 34	29	5 81	6 12	5 56	6 09
30	2 57	2 42	2 38	2 40	30	5 85	6 16	5 60	6 14
31	2 64	2 49	2 45	2 46	31	5 89	6 20	5 64	6 19
32	2 71	2 56	2 52	2 53	32	5 94	6 24	5 69	6 21
33	2 77	2 62	2 60	2 60	33	5 99	6 29	5 74	6 29
34	2 85	2 69	2 69	2 68	34	6 04	6 34	5 79	6 34
35	2 92	2 76	2 78	2 76	35	6 09	6 39	5 84	6 39
36	3 01	2 85	2 85	2 85	36	6 15	6 44	5 90	6 45
37	3 09	2 93	2 93	2 94	37	6 21	6 51	5 93	6 51
38	3 18	3 02	3 03	3 04	38	6 28	6 57	6 04	6 58
39	3 27	3 11	3 13	3 14	39	6 35	6 64	6 11	6 63
40	3 37	3 21	3 23	3 24	40	6 44	6 74	6 19	6 72
41	3 48	3 31	3 33	3 35	41	6 53	6 81	6 28	6 80
42	3 59	3 42	3 45	3 46	42	6 62	6 91	6 37	6 88
43	3 71	3 54	3 56	3 58	43	6 72	7 01	6 46	6 97
44	3 83	3 65	3 70	3 70	44	6 84	7 13	6 57	7 07
45	3 97	3 81	3 85	3 84	45	6 95	7 23	6 68	7 18
46	4 11	3 96	4 00	3 98	46	7 18	7 36	6 80	7 30
47	4 25	4 12	4 15	4 13	47	7 22	7 48	6 92	7 43
48	4 41	4 29	4 30	4 29	48	7 36	7 64	7 05	7 57
49	4 58	4 47	4 46	4 46	49	7 52	7 76	7 19	7 71
50	4 75	4 66	4 64	4 64	50	7 67	7 94	7 35	7 86
51	4 94	4 86	4 80	4 83	51	7 83	8 10	7 51	8 01
52	5 14	5 07	4 93	5 03	52	8 00	8 26	7 69	8 17
53	5 35	5 29	5 15	5 24	53	8 17	8 43	7 88	8 30
54	5 57	5 52	5 35	5 46	54	8 35	8 61	8 07	8 50
55	5 81	5 78	5 56	5 71	55	8 54	8 80	8 18	8 68
56	6 06	6 05	5 78	5 96	56	8 74	9 00	8 47	8 87
57	6 33	6 33	6 03	6 24	57	9 96	9 22	8 68	9 07
58	6 61	6 62	6 28	6 54	58	9 20	9 45	8 92	9 29
59	6 91	6 92	6 56	6 87	59	9 44	9 69	9 15	9 53
60	7 23	7 25	6 86	7 23	60	9 70	9 95	9 40	9 80
61	7 57	7 75	7 20	7 62	61	9 99	10 23	9 68	10 10
62	7 93	8 30	7 55	8 04	62	10 32	10 57	9 97	10 43
63	8 31	8 90	7 88	8 50	63	10 68	10 92	10 26	10 78
64	8 72	9 55	8 20	9 00	64	11 05	11 30	10 59	11 15
65	9 15	10 25	8 60	9 54	65	11 48	11 70	10 95	11 53
66	9 61	11 00	..	10 12	66	..	12 00	11 33	11 90
67	10 10	11 80	..	10 75	67	..	12 28	11 95	12 25
68	10 62	12 65	..	11 43	68	..	12 56	12 21	12 58
69	11 17	13 55	..	12 17	69	..	12 84	12 73	12 88
70	11 76	14 50	..	13 00	70	..	13 12	..	13 15
71	12 38	..	..	..	71	..	13 40	..	13 38
72	13 04	..	..	..	72	..	13 68	..	13 58
73	13 74	..	..	..	73	..	13 95	..	..
74	14 48	..	..	..	74	..	14 20	..	..
75	15 25	..	..	..	75	..	14 45	..	..
					76	..	14 70	..	..
					77	..	14 95	..	..
					78	..	15 20	..	..
					79	..	15 45	..	..
					80	..	15 70	..	..

* The premium ceases to be paid at 80 years of age, and the sum assured is paid at the age of 85 even if the assured be still alive.

† The Azienda grants the same conditions to those who assure before they have reached their 50th year.

B.—Fire Insurances.

The Companies which insure against fire are divided into Mutual and Proprietary Companies.

Mutual Companies.

The Companies insuring only buildings are five in number, viz. :—

1. *Kais. Kön. Priv. Wechselseitige Brandschaden Versicherungs Anstalt in Wien.* (Mutual Fire Insurance Company in Vienna, for Austria Proper and Hungary.)

2. *Kais. Kön. Priv. Innerösterreichische Wechselseitige Brandschaden Versicherungs Anstalt in Gratz.* (Mutual Fire Insurance Company in Gratz, for the provinces of Styria, Carinthia, and Carniole.)

3. *Kais. Kön. Priv. Böhmische Wechselseitige Brandschaden Versicherungs Anstalt in Prag.* (Mutual Fire Insurance Company in Prague for Bohemia.)

4. *Kais. Kön. Priv. Wechselseitige Brandschaden Versicherungs Anstalt, für Tyrol in Innsbruck.* (Mutual Fire Insurance Company in Innsbruck, for the Tyrol, Voralberg, and the Principality of Lichtenstein.)

5. *Kais. Kön. Priv. Wechselseitige Brandschaden Versicherungs Anstalt, für Mähren und Schlesien in Brünn.* (Mutual Insurance Company against Fire at Brünn, for the provinces of Moravia and Silesia.)

These Companies are mostly constituted upon what is properly called the mutual principle—that is to say, each of the members of the Society contributes proportionally to the sum for which he is insured to the losses and expenses of management, the computation of which is made at the end of each year. In a few, the annual contributions are limited to a certain maximum, which cannot be exceeded. If this maximum be not sufficient to pay the losses and the expenses, the surplus is taken from the reserved fund, or, in default thereof, the board of management have recourse to a loan, repayable in the course of a certain number of years. The reserved fund is formed by means of an admission-fee from each member of the Society, and by a proportion of the profits set apart in the successful years.

These institutions are under high patronage, and are much favoured by the local authorities; the expenses of their management are very small, but their statutes are generally very imper-

fect, independent of the defects inherent in the mutual system; conditions are enforced which show but little practical knowledge of insurance, and especially a very incomplete classification of risks. The consequence is, that the proprietors of the worst class of buildings are favoured beyond measure at the expense of those who possess the best.

Besides the principal Companies above described, there exist in some provinces, and especially in Bohemia, several other mutual associations, the operations of which only extend to a few districts, and the members of which undertake to assist one another, either in money or materials, in case of fire; but their organization is too incomplete, or too little known, to be able to speak with proper knowledge of them. Consequently we confine ourselves to bringing together the principal facts in the working of the Companies already named. (*See* Table II.)

Proprietary Companies.

1. *K. K. Priv. Azienda Assicuratrice,* established in Trieste in 1823, with a capital of £150,000, 10 per cent. of which is paid up. This Company was very successful in its first years of operation, but afterwards sustained severe losses, which absorbed the reserved fund which it had accumulated, and obliged it in 1839 to demand from its shareholders a second instalment of 20 per cent.

Since then its position has sensibly improved; it has not only paid up the deficit, and kept untouched the payments of the shareholders, viz., 30 per cent., but has also begun to form a new reserved fund.

The Company insures not only against risks by fire, but also against risks by maritime and inland navigation, as well as the conveyance of merchandise by land, and has recently undertaken, in addition, assurances on human life, having increased the capital of the Company by £50,000, which now amounts to £200,000.

2. *K. K. Priv. Erste Oesterreichische Versicherungs Gesellschaft.* —The first Austrian Insurance Company, established in Vienna in 1824.

This Company possesses a capital of £300,000, 20 per cent. of which is paid up, and insures against risks by fire, maritime and inland navigation, those of conveyance of merchandise by land, and, finally, against risks by hail.

3. *The Milan Insurance Company*—founded, as we have already said in the chapter on life assurances, in 1826, with a capital of

TABLE II.—*Analytical Table of the Mutual Fire Insurance Companies established in Austria.*

Name of the Company.	Year when founded.	Sums insured, at the end of 1859.	Losses paid in 1850.	Losses paid since the establishment of the Company to the end of 1850.	Average annual contributions from the establishment of the Company to 1850.	Observations.
		£	£	£	Per cent.	
1. Kai. Kön. Priv. Wechselseitige Brandschaden Versicherungs Anstalt in Wien	1825	4,729,720	20,258	593,662	·576	This average is that of buildings of the first class.
2. Kai. Kön. Priv. Osterreichische Wechselseitige Brandschaden Versicherungs Anstalt in Gratz	1829	4,310,713	12,446	171,993	·260	Ditto.
3. Kai. Kön. Priv. Böhmische Wechselseitige Brandschaden Versicherungs Anstalt in Prag	1829	3,740,959	15,080	393,067	·440	General average of all classes.
4. Kai. Kön. Priv. Wechselseitige Brandschaden Versicherungs Anstalt für Tyrol in Innsbruck	1825	4,070,981	12,312	96,720	·120	Average of all buildings indiscriminately.
5. Kai. Kön. Priv. Wechselseitige Brandschaden Versicherungs Anstalt für Mähren und Schlesien in Brünn	1830	1,501,714	5,896	162,303	·370	Average of buildings of the first class.
		18,354,087	65,992			

£200,000; of which £120,000 is applicable to life assurances, and £80,000 to fire insurance.

4. *K. K. Priv. Assicurazioni Generali* (formerly *Assicurazioni Generali Austro-Italiche*).—We repeat that this Company, of which we have already spoken in the chapter on life assurance, was established in Trieste in 1830, with a capital of £200,000, and that the half of this capital, 10 per cent. of which was paid up, is specially appropriated to life assurance.

5. *K. K. Priv. Riunione Adriatica di Sicurtà.*—Established in Trieste in 1838, with a capital of £200,000, 15 per cent. of which was paid up.

This Company insures against risks by fire, maritime and inland navigation, and conveyance of merchandise by land. Although the last established of the Austrian Companies, the amount of its transactions already far exceeds those of other Companies previously established.

We now subjoin an analytical table of the operations of the Proprietary Companies, as correctly as the reports which they have published allow. We, however, think it proper to observe:—

1. That these reports give collectively the results of the several branches of insurances in each Company, with one exception, that of the life assurance branch, which is the object of special reports.

2. That the Proprietary Austrian Companies also insure, either directly or indirectly (that is, by reinsurance), foreign risks.

3. That the title of (*Kaiserlich, Königlich, Privilegirte*) Imperial, Royal, and Privileged, which precedes the name of most of the Austrian Companies, by no means indicates that they depend in any way upon the State; it is the title given to the Companies, the statutes of which, after having been approved of by the executive and judicial authorities appointed to examine them, and to satisfy themselves among other things of the actual existence of the Company's capital, and of the instalments being paid up, obtain the imperial sanction, and are thereby admitted to the enjoyment of certain privileges. (*See* Table III.)

According to this table, the sums assured in 1850 by the Companies would be £148,416,729. It is, however, proper to deduct the portion chargeable to the other branches of insurance, exclusive of the fire insurance branch, which may be estimated at £28,416,729, amounting in round numbers to £120,000,000, being the sums insured against fire; but as these sums only represent (except in the case of the Milan Company, which gives the total amount of the assurances at risk in each year) the assurances effected in 1850,

TABLE III.—*Analytical Table of the Proprietary Fire Insurance Companies in Austria at the end of* 1850.

Name of the Company.	Year when founded.	Nominal Capital.	Proportion paid up.	Sums insured in 1850. *a*	Premiums on insurances in 1850. *a d*	Losses paid in 1850. *a*	Losses paid since the foundation of the Company. *a*	Premiums reserved for insurances at risk.	Reserved Fund.
		£	Per cent.	£	£	£	£	£	£
Kai. Kön. Priv. Azienda Assicuratrice in Trieste	1823	200,000	30	31,171,669	51,684	37,485	801,166	31,368	1,015
Kai. Kön. Priv. Erste Oesterr. Versich. Gesellschaft (First Austrian Insurance Company in Vienna)	1824	300,000	20	22,678,215	87,291	45,360	482,080 *e*	57,553	1,275
The Milan Insurance Company	1826	80,000 *b*	20	34,372,584 *f*	32,390 *f*	20,094 *f*	233,885 *g*	17,736	34,833
Kai. Kön. Priv. Assicurazioni Generali in Trieste	1830	100,000 *c*	10	30,500,865	168,787	84,533	11,12,815	136,330	29,071
Kai. Kön. Priv. Riunione Adriatica di Sicurtà in Trieste	1838	200,000	15	29,693,396	141,965	82,173	720,564	105,585	21,342
				148,416,729	482,117	269,645	3,350,510		

a. The sums shown in these columns include—
For the Azienda and Riunione the risks by fire, of maritime and inland navigation, and the conveyance of merchandise by land.
For the First Comp. Aut. Assic. Gener., ditto, ditto, ditto, and against hail.

b. Independently of £120,000 appropriated to life insurances.

c. Independently of £100,000 appropriated to life insurances.

d. This sum is clear of reinsurances, agents' commissions, discounts.

e. This sum only includes losses paid during the years 1839 to 1850; those of the preceding years are not known to us.

f. The returns of 1849 and of 1850 are not yet published.

g. Until 1849.

there can be added a sum of at least £30,000,000, for assurances for a period of years previously effected; and, finally, by adding thereto the sums assured by the Mutual Companies, according to Table II., with those assured by other mutual associations of less importance, about £22,000,000.

	£
Sums assured in 1850	148,416,729
Deduct other branches of insurance, exclusive of fire insurance	28,416,729
Amounting in round numbers to .	120,000,000
Assurances prior to 1850	30,000,000
Mutual Companies (Table II.), and others of less importance	22,000,000
The total amount of insurances against fire in Austria, is about	£172,000,000

This sum is, indeed, of not much importance, if the amount in other countries of Europe, and their respective populations, be compared; but if we consider that in Austria the landed property is in a great measure concentrated in the hands of a small number of individuals—that trade, and even agriculture, are still so little advanced—that the rural population is for the most part in the greatest poverty—it will be easy to perceive that it is not disproportioned to the state of the country, and it would be impossible to obtain a considerable increase unless this situation be sensibly improved.

It is, however, fair to state that the Austrian Companies fulfil in the most honourable manner the engagements which they contract with the assured, and that their integrity and stability give them a just title to public confidence.

We would draw attention to the large proportion of premiums which, according to Table III., are reserved by each Company for the assurances at risk.

C.—Maritime Assurances.

Trieste is the only town of Austria where maritime insurances are and can be effected on a large scale.

In Venice only insurances are effected through the agencies of the Trieste and Vienna Companies; Fiume and Lussino both have local Companies, but of very little importance. It would be impossible, however, for us to tell even imperfectly either the amount

of their business or its results, because the Companies which exclusively carry on this branch of insurance do not give publicity to the accounts which they present to their shareholders. We must, therefore, confine ourselves to the mere enumeration of these Companies, which are 30 in number.

Mixed Companies.

1.	Imp. Roy. Priv. Azienda Assicuratrice	Already described under other branches of assurance.
2.	First Austrian Company	
3.	Assicurazioni Generali	
4.	Riunione Adriatica di Sicurtà	

Companies exclusively Maritime.

		£
5.	Adriatico Banco d'Assicurazioni	60,000
6.	Nuova Società Commerciale	60,000
7.	Nuovo Stabilimento d'Assicurazioni	25,000
8.	Greca Concordia d'Assicurazioni	25,000
9.	Austria Assicuratrice	20,000
10.	Camera Assicuratrice	20,000
11.	Socj. Assicuratori	20,000
12.	Banco d'Assicurazioni	18,000
13.	Austriaca Compagnia d'Assicurazione	15,000
14.	Banco Orientale d'Assicurazione	15,000
15.	Banco Veneto d'Assicurazioni	15,000
16.	Camera Cosmopolita d'Assicurazione	15,000
17.	Compagnia Filemporica d'Assicurazione	15,000
18.	Compagnia Nazionale d'Assicurazione	15,000
19.	Intrepida Compagnia d'Assicurazione	15,000
20.	Nuova Alleanza d'Assicuratori	15,000
21.	Compagnia Cittadina d'Assicurazioni	15,000
22.	Società Assicuratrice	15,000
23.	Società Triestina d'Assicurazione	15,000
24.	Stabilimento Commerciale d'Assicurazioni	15,000
25.	Unione Assicuratrice	15,000
26.	Nuova Compagnia Pattriottica d'Assicurazione	15,000
27.	Società Elvetica d'Assicurazione	13,000
28.	Compagnia degli Amici Assicuratori	12,500
29.	Associazione Assicuratrice	12,000
30.	Nuovi Assicuratori	10,000
		£505,500

On the Life Assurance Companies of Germany—their Constitution, Condition, and Prospects: being the substance of a Paper presented to the Institute of Actuaries by HERR RATH G. HOPF, *Manager of the Lebensversicherungs Bank für Deutschland in Gotha.*

[Read before the Institute of Actuaries, 29th November, 1852, and ordered by the Council to be printed.]

NEXT to England, Germany is the country in which the principles of life assurance have had the most successful development. It is true the more recent French Companies, La Caisse Paternelle, L'Equitable, La Caisse des Ecoles et des Familles, which also call the assurances granted by them *assurances sur la vie,* show a greater extension in a shorter time; but what they guarantee to the public are not life assurances in our sense of the word. They are neither assurances granted for previously specified sums, nor is the payment of the claim dependent on the death of the assured. The more modern French life assurances are rather indefinite reversions obtained by paying in any sum the assured pleases, the interest of which (as in the Tontines), according to the mortality found to prevail in the different classes, may prove sometimes greater, sometimes less, and is only divided amongst those who attain the term of life which may have been previously agreed on. The contributions of those who die early, together with the interests thereon, go to augment the dividends to the surviving members. Whilst life assurance amongst the English and Germans is therefore calculated to be on the death of the assured a source of provision for their families, the more recent mode of life assurance amongst the French principally aims at granting to the assured himself, in his lifetime, an annuity or sum of money, which, increasing according as the computations are made for an earlier or later period, affords him the means of extending his business, of completing his education, of securing a dowry on marriage, or a provision in old age. In consequence, partly of the prospect of self-enjoyment of the reserve thus made, partly the possibility of obtaining a high profit for a small investment through a greater mortality in the classes than the tables assumed, this kind of assurance became very much in vogue amongst the French. Recently, however, a clearer understanding of the matter, and the exposure of some deceptions which a few of the Companies or their managers have been guilty of, have in some degree cooled the public favour. It is evident

that since the income is very indefinite and fluctuating, no fixed plan of life assurance can be founded thereon. The reflecting German had but little taste for it, and the attempts made by several of the modern Life Assurance Companies, out of Germany, to extend their operations there, were followed by no results. It is true that there have existed in France for a considerable period several Companies by which life assurances are granted in our sense of the word, that is to say, they undertake assurances by which, according to a fixed single or by periodical payments, a certain sum before stipulated is agreed to be paid on the death of the assured. This plan is followed by the mixed Proprietary Assurance Companies, La Compagnie Nationale (formerly Royale), La Compagnie d'Assurances Générales, and L'Union. But the operations of these Companies are very restricted, and the total of the assurances undertaken by them amounts to not more than about twenty to thirty millions of francs (£800,000 to £1,200,000). It seems that the "whole life" assurance, which in England and Germany is so much in favour, agrees but little with the French taste and character. The cradle for this kind of assurance was England. Whilst Widows' Funds, Burial Funds, and Annuity Companies first of all sprang up in Germany, France, and Holland, and that so early as the 17th century, and, even with very imperfect organization, prospered to a great extent, the first Life Assurance Company was founded upon the mutual principle in London in 1706, under the name of the Amicable. The regulations then established were still in some degree imperfect, like those of the older German Burial Clubs. Only persons under forty-five years of age were admitted. All members paid an equal contribution of 7½ per cent. entrance-money and 5 per cent. annually, and the receipts were divided each year in equal proportions amongst the representatives of those who died in the year. Although, soon after the establishment of the Amicable, other Life (acting also as Fire) Assurance Companies were founded (namely, the London Union, 1714, the Royal Exchange, 1720, and the London Assurance Corporation, 1720), still the system of life assurance progressed but little, till in 1762 the renowned Equitable Society commenced upon better and more scientific principles. Since then this kind of family provision has been more in favour; but it was long in England before it was appreciated by the public in general, and at the end of last century there were only about ten Life Assurance Companies, of which the greatest, the Equitable, at that time consisted of not

more than 5124 members. It was not till after the termination of the wars of Napoleon, when the blessings of freedom spread over all Europe, and all branches of human industry began to flourish, that life assurance also, through the establishment of numerous Companies, came to perfection; and it was taken advantage of by all classes of the population. But scarcely any country can be pointed out where it spread so rapidly as in England, where the rights of primogeniture interested so many fathers of families to make provision by its means for their daughters and younger sons, not succeeding to the inheritance—where, besides, so many important undertakings, of which the success depends on individual exertions, lead to life assurance as a protection against losses likely to arise from premature death—where, above all, the possession of capital, as well for business transactions as for the education and improvement of the youth (which in that country is left, for the most part, to the care of private individuals) is of more value than upon the Continent. As it was in England that the precursors of life assurance, the Savings Banks, first found the most favourable reception, so there the Life Assurance Companies themselves have attained the most flourishing condition. There exist at the present time in England about one hundred and thirty Companies, of which very nearly one hundred have their chief office in London. This great competition, and the co-operation of the many distinguished men who dedicate their abilities to these Companies, have contributed to bring the system of life assurance in England to the utmost degree of perfection as regards both theory and practice, and to make known its value and profit to all classes of the people. The desire to outbid one another has indeed led some Companies into measures and arrangements by no means worthy of commendation. The number of Life Assurance Companies in England appears unnecessarily large, for many of them have so small an income that they can scarcely be in a position to make head for any lengthened period against unfavourable changes of events. The total amount of assurances for which all the English Companies are at present liable (not reckoning life annuities) may be computed at about £130,000,000 sterling, and the average amount of assurance on each life about £600 sterling, amongst a total of about 220,000 persons assured, the greater part of whom are English, although these Companies extend their business to all parts of the world. In a still higher degree than these Life Assurance Companies (which are specially adapted for the wealthier classes) do the Burial Clubs and the Friendly

Societies for provision in sickness and old age amongst the working classes flourish. One of these associations, the Manchester Unity of Odd Fellows, alone numbers no less than 150,000 members.

In Germany, about the year 1806, and also about 100 years after the oldest Life Assurance Company in the world—the Amicable, of London—had come into existence, the first attempt was made to form a similar Company, principally through the exertions of Benecke, of Hamburg, the well-known writer on assurance. The undertaking, however, found but little support, on account of the troublesome wars with which the interior of our country was torn; and the Company having at an early period sustained heavy losses, found itself soon under the necessity of closing the business. A second attempt was made in 1822, by the Fire Insurance Company then established in Elberfeld, to combine that branch with life assurance, but met with no greater success. Germany, scarcely freed from foreign oppression, and at that time too occupied with other more pressing interests, could not give to this undertaking the attention which was due to it, and thus it happened that it was again given up even before a single assurance had been actually completed.

But as the benefits of life assurance appeared so great, the attempt was again renewed, about the years 1826 and 1827, in Gotha (where Arnoldi had established the well-known Fire Insurance Bank with the happiest results), by the active exertions and under the direction of this patriotic man. He endeavoured first of all to make evident to the public the nature and advantages of life assurance, which up till that time was scarcely known in Germany. The small amount of life assurance which up till then had been effected was undertaken by English Companies. These last demanded high premiums, without allowing any return of profits. A prejudice was excited against them, by the fear that in disputed cases they would not be subject to the German laws, but that it would be necessary for any legal process to be carried on in the English courts, liable to their tedious prolixity and excessive costs. A remarkable instance occurred at that time in the action concerning the assurance undertaken by several English Companies on the life of the Duke Frederick IV., of Gotha. Two of the Companies paid; the other three refused payment. The policy-holders commenced an action against one of the latter, but could bring it to no issue, and were obliged to let it drop; for after three years' process, and before any decision had been given, the costs amounted to nearly 27,000 thalers (£3,857).

For a sum in dispute of £3,200, the mere fees of the plaintiff's counsel, the afterwards celebrated Lord Brougham, amounted to not less than £2,700.

This disheartening case served to enlighten the public on the necessity for the formation of a German Assurance Company, and to arouse them to carry out the plan already proposed in Gotha. This Company accordingly came into existence on 1st January, 1829, after having been in process of formation since 1827. The desire for life assurance awakened in Gotha soon began to spread throughout all Germany. Nearly at the same time with the Gotha Bank a Share Company for Life Assurance was established in Lubeck, and afterwards by degrees ten other Life Assurance Companies were founded, of which the principal regulations, so far as they have reference to the system of assurance, shall be here briefly explained.

I. The Life Assurance Bank for Germany in Gotha (*Die Lebensversicherungs Bank für Deutschland in Gotha*), depending upon its mutual character and the publicity of its management, was opened on the 1st January, 1829, with a total of 794 members and 1,390,900 thalers (£198,700) sums assured. Everyone is a participating member who opens a policy of assurance for life or survivorship with the Bank, and his share in profits is proportionate to the amount of annual premium paid by him. The average annual surplus, ascertained after five years' accumulation in the assurance fund, is divided amongst the participating members as profit. Every participating member receives on the sixth payment of premium the dividend of his year of entrance—on his seventh payment of premium, the dividend of his second year's membership, &c. The dividends not yet declared to him when his assurance expires, either by death or voluntary retirement, would remain to the account of the remaining policy-holders. Up to the present time the dividends have fluctuated between 18 and 31 per cent. of the annual premiums, and amount on an average to 24 per cent. Up till the period of division, the surplus of premiums forms the assurance fund, out of which the extra payments would be made, if at any time the annual receipts should not prove sufficient to meet the expenditure—a case which has not yet happened, and which, with the increase and extension of the Company, need never happen.

The Bank undertakes assurances for whole life, assurances for a given number of years (short period assurances), survivorship assurances, and assurances upon joint lives, by means of an easy division of the double claim in two survivorship policies. With other com-

plicated and less usual forms of assurance the Company has little to do, nor does it include to any great extent the granting of life annuities. It assures only the lives of persons resident in Germany who are healthy, and not such as, through their business, occupation, or manner of living, give reason to anticipate an early death. It accepts assurances for sums from 300 thalers (£43) to 10,000 thalers (£1,429) on one life.

The premiums have been specially computed. They have for their basis the table of mortality, published by the English mathematician, Babbage, from the experience of the Equitable Society of London, considerably modified by the experience on the Continent, especially at the higher classes of age, the mortality at which appears upon the Continent to be considerably greater than in England.*

The table so obtained shows that out of 6460 persons at the age of ten years only ten are living at the age of 90, who at this age die together; whilst, according to Babbage's table, out of that number of persons at 10 years of age there are still 170 living at age 90, all of whom expire before 98 years of age. The premiums being computed by this table at 3 per cent. interest, would provide for any possible fluctuations of mortality by the increase arising therefrom, and up to the present time have not only proved fully sufficient, but have also given a higher average dividend than the addition thereto would lead to expect.

The Bank not only assures against the risk of death by disease of every kind, and against all accidents to which the assured is exposed, except through wilful negligence, but also pays the claims of those who have fallen in conflict for the restoration of peace and

* Whether the mean duration of life on the Continent, and especially in Germany, is less than in England, cannot, for want of sufficient observations, be ascertained with certainty. It appears, however, that in England more people attain to a higher age than upon the Continent. According to the accounts of the census published in the year 1841, there were in England and Wales, out of 15,927,867 persons, 1,147,108, or 7·2 per cent., above 60 years of age, and amongst them not less than 249 were of 100 years of age and upwards. By the census in Belgium in 1831, out of 4,000,000 there were only 16 of 100 years of age and upwards. In Wurtemburg, in 1832, out of 1½ million there was only one of that age; and by the last census in Prussia, at the end of 1849, the number exceeding 60 years of age was scarcely 6 per cent. of the total population. The actual experience of the Gotha Bank, although it is not yet sufficiently extended to give a solution to this question on a positive basis, has up to the present time confirmed the above hypothesis. Notwithstanding that the table of mortality used by the Bank shows, for the higher classes of age above 55 years, an essentially greater mortality than all the approved English tables, still, according to the tenor of the reports of the Bank, the actual mortality at these ages is up to the present time, on an average, greater than was expected. (See Report for 1848, § 16.) It may, indeed, be a question, to decide what influence the frequent voluntary retirement of healthy members has on the increase of the mortality of the members remaining in the Company, and whether it is not equal to the profits which the outgoing members yield to the funds of the Company.

order, or in defence of their lives and property. The assurance suffers no prejudice by entering the militia; military men may be assured at the ordinary premium, and pay according to the risks of service in peace. The risks of active war service, which the Bank considers to begin when the troops are called into actual service before the enemy, after war has broken out, are excluded from the guarantee. In all these cases the policy-holder receives the value which the Bank would have given for the voluntary surrender of the policy. In cases of suicide *non compos mentis*, the full value is given. Military men also receive this higher return who relinquish their policies on account of war service, and do not apply for a suspension of them only.

The assured may travel within the limits of Christian Europe, and voyage on the East and North Sea between Havre and Portsmouth, without perilling the validity of the assurance, for the space of one year, and without giving information to the Office. Other and longer journeys require a license, and if greater risk is incurred a corresponding extra premium must be paid.

As the Gotha Bank was the first to excite and animate the desire for life assurance in Germany, it was also desired that its institution should keep pace with German wants and German peculiarities. In many respects, therefore, it must deviate from English models. Besides differing in the conditions of assurance, this is especially the case in the working out of the mutual principle. The mode of settling the rights and obligations of the members—the successive and entire division of the surplus by an annual average in proportion to the annual premiums contributed by the assured—is peculiar to this Company, and different from the plan hitherto pursued by most of the Assurance Companies in England. The Bank endeavours thereby to act with strict justice towards its members, and to pay back to each as far as possible that share in the surplus which he, by his payments of premium, has contributed towards it. It does not benefit one class at the expense of another. The greater part of English Companies ascertain the surplus after long periods, and allot it to the sums assured, frequently in a proportion arbitrarily fixed, but mostly on an increasing scale for the older members and in different degrees according to the different classes of age in the Company. The greater part of the purely mutual and mixed Companies existing in Germany have followed the principles of the Gotha Bank, and not those of the English Companies, so that the various systems of the latter are but little known amongst us.

Of the other peculiar regulations of the Gotha Bank, which it has first introduced into the assurance system on right theoretical principles and in harmony with the original basis, may be mentioned the following.

1. Every assurer may select from the proportionate tables of premiums any rate less than that at his own age of admission, and make up the difference by a single payment. The smaller premium is then the measure of his share in the Bank and in the surplus itself. The single payment devolves to the Company unconditionally, without having any dividends attaching to it. It is considered as a new assurance in the reserve, to be set apart in the same manner as if the assured had been admitted into the Company at the younger age to which the rate of premium which he has selected belongs.

2. In conformity with the basis of their premium tables, not only does the payment of premium cease on the assured attaining his ninetieth year, but he may also receive, on his attaining this age, the sum assured in his lifetime, since at this age the reserve is equal to the sum assured. But every member to whom the term of the ninetieth year appears too distant, may, if he desires to be placed in earlier possession of the sum assured or to cease paying the premium on reaching a higher age, when he may be less able to acquire an income, enjoy for a proportionate premium the advantage of ceasing to contribute and of obtaining the sum assured at any younger age he pleases.*

A life assurance of this character is not exactly the means on the death of the assured of providing for his representatives, but it will enable him to make a provision for himself at a later period of life.

3. The advantage enjoyed by those who withdraw is definitely fixed by the Gotha Bank, and depends not in each particular case on what is called the market value of the policies. The Bank proceeds on the principle that, with few exceptions, the full value of the policy or the whole reserve should not be repaid, since the right to withdraw from the assurance compact belongs only to the assured, and since in most cases only healthy persons take advantage of it, whilst the invalid and deteriorated lives remain in

* The increased premium is so computed that at the time of payment of the sum assured the reserve shall be equal to the full value paid. If, for instance, a person thirty years old wishes to receive the sum assured at sixty years of age, in case it should not have become a claim by death at an earlier period, he will have to pay, with his original premium, a further annual premium of ·854 per cent. If this party has been already five years assured, when he first desires at the age of thirty to modify his assurance in the way described, the yearly premium will then only be ·810 per cent.

the Company and occasion a greater mortality (as has already been shown to be the case at the older ages in the Gotha Bank), to equalize which the Company needs the profits from the withdrawing members. The practice of the Gotha Bank is theoretically correct, and consists in increasing the amount paid for the purchase, in proportion to the absolute value of the policies, allowing of a gradual increase to that point at which the full sum assured would be paid at last to the assured in their lifetime. Accordingly, when the reserve is—

Per cent. of the Sum Assured.		Per cent. of the Reserve.
1 to 20	a purchase price is allowed of	50
20 „ 22	„	51
22 „ 24	„	52
24 „ 26	„	53

By the same rule is regulated the amount which the Bank may advance to the assured on the mortgage of their policies. The Bank pays the full reserve, as before observed, only in a few exceptional cases—as, for instance, when the assurance is invalidated in consequence of some change in the circumstances of the assured, such as being called into actual military service, or by dying by his own hands (not *felo de se*). In cases of intentional suicide the usual price only is allowed.

4. Another regulation peculiar to the Gotha Bank is that the assurance may be temporarily suspended during a journey or a campaign, and during this time the payment of premiums is discontinued; provided that when the policy (the assured being in good health) is again in force, not the amount of the full premium that would have been paid in the interval, but only that portion of it by which the reserve would be increased, should afterwards be paid.

II. The German Life Assurance Company in Lubeck (*Die Deutsche Lebens Versicherungs Gesellschaft, in Lübeck*) was established at about the same time with the Gotha Life Assurance Bank, but issued its first policy about a month earlier, viz., on 1st December, 1828. It is constituted as a mixed Proprietary Company, and originally distributed to the assured a proportion of the profits every seven years, but now every four years. This proportion now amounts to three-fourths, whilst it was originally fixed at only one-half. The share capital, to the nominal amount of 1,275,000 marcs current (£76,500), is divided into 425 shares, each of 3,000 marcs current (£180), whereof £10 per cent. is paid up.

The Company undertakes a great variety of assurances, including, besides sums payable on death in the usual manner, also endowment assurances and life annuities. The first kind of assurances it grants in sums of from 300 to 30,000 marcs current (£18 to £1800), restricted to the lives of healthy persons who reside either in Europe or in countries not hitherto subject to the plague or yellow fever. The premiums for these assurances are similar to those of the Equitable Society of London. They are computed from the well-known Northampton Table at the rate of 3 per cent. interest, and since this table exhibits too high a rate of mortality, no addition is made thereto;* at the younger ages they are somewhat higher, and at the older ages somewhat lower, than those of the Gotha Bank.

The Lubeck Company undertakes the usual kind of business;

* Whether the Company also values its reserve by the Northampton Table is not known. Such a proceeding is not to be recommended to them; on the contrary, those Companies which with the view of safety have computed their premiums according to one of the tables showing too high a rate of mortality, such as the Northampton or Süssmilch, should calculate the values of their policies by one of the tables which show the real mortality already experienced in the Company, or which may be expected for it. The tables most suitable for the computation of premiums for Life Assurance Companies are indisputably the excellent tables of Brune, deduced from the observations of the Prussian Widows' Provident Fund, and those constructed from the observations of the seventeen English Life Assurance Companies. The following comparison will show how the values will come out according to these and according to the Northampton. It will be seen that the value reserved, according to the latter table, at corresponding ages and periods of assurance (some few cases excepted), is too small. At the division of the surplus, a portion of the profits included in the premiums, and which belongs to the future, to cover unfavourable fluctuations of mortality, will by this process of calculation be anticipated out of the actual value of the risk.

Reserve or Value of Policy, for a Whole Life Assurance of £100, payable by an Annual Premium computed according to three different Tables of Mortality.[a]

After Years.	Age of Admission. 20.		Age of Admission. 30.			Age of Admission. 40.			Age of Admission. 50.			Age of Admission. 60.		
	17 English Life Companies.	Northampton.	Brune (Male).	17 English Life Companies.	Northampton.	Brune (Male).	17 English Life Companies.	Northampton.	Brune (Male).	17 English Life Companies.	Northampton.	Brune (Male).	17 English Life Companies.	Northampton.
5	4·19	4·21	7·07	5·95	5·44	9·21	8·73	7·35	12·86	12·14	9·53	16·69	16·14	13·68
10	8·97	8·82	14·49	12·69	11·49	19·10	18·23	15·28	26·02	24·50	19·77	32·51	31·32	28·23
15	14·39	13·77	22·42	20·31	18·00	29·50	28·15	23·34	38·37	36·68	30·74	45·50	45·05	42·48
20	20·52	19·29	30·82	28·60	25·02	40·15	38·26	32·02	50·07	48·15	43·19	57·20	57·10	55·64
25	27·46	25·23	39·72	37·27	32·15	50·14	48·22	41·32	59·68	58·51	54·65	71·23	67·67	66·41
30	35·01	31·63	48·82	46·10	39·83	59·60	57·60	51·21	68·34	67·61	64·41	82·20	77·52	74·07
35	42·89	38·13	57·36	54·79	48·06	67·38	66·07	60·90	78·71	75·59	73·05	..	85·75	88·48
40	50·93	45·13	65·46	62·98	56·81	74·38	73·52	69·84	86·89	83·03	79·19			
45	58·84	52·64	72·11	70·38	65·39	82·77	80·04	77·16	..	89·23	90·76			
50	66·30	61·62	78·10	76·88	73·31	89·40	86·13	82·37						

[a] We have altered the arrangement of this table for greater convenience of comparison, and dropped one decimal figure.—Ed. *A. M.*

but sea voyages are not allowed during war time, and in time of peace only on the Baltic, the North Sea, and the Channel between Havre and Portsmouth, during the seven favourable months from 1st April to 31st October; other voyages require a license from the Company, with payment of an extra premium. Assurances on the lives of military men may also be granted against military risks, on payment of an extra premium, to be specially computed in peculiar cases, and either of equal amount from the beginning of the assurance, or to commence with actual service. Death by duelling or suicide, or the hands of justice, invalidates the policy unless it be of ten years' standing, or unless a third party not connected with the representatives of the deceased has *bonâ fide* purchased the policy at the least two months before the death of the assured, according to the manner indicated in the statutes: in the last case, the full sum assured will be paid.

The division of profits to the assured is peculiar. It is regulated, not as usual, according to the total of the premiums paid, but according to the proportion of the sum assured and the number of years elapsed since the last division of profits, and is distributed in the next four years by coupons, either in cash payment or by deduction from the premium. This method bestows upon those assured at the younger ages a greater portion, at the cost of those who are assured at the higher ages. Only those members who survive to a division of profits partake of the dividends. Up to the present time there have been three distributions of profits: at the end of 1835 there was divided, on every £100 sum assured, ·2207 for one year; at the end of 1842, ·1842; at the end of 1849, ·2895, making together ·6944, consequently giving an annual average of ·2315.

III. The Leipzic Life Assurance Company (*Die Leipziger Lebensversicherungs Gesellschaft in Leipsig*) was established on the mutual principle about the year 1831, on a similar basis as the Gotha Life Assurance Bank, and is essentially governed by the same regulations. The Leipzig Company also derives its rates of premium from the Gotha Company, but fixes the age of 85 years for the stipulated period for the discontinuing of the premium, instead of 90 years, as in the Gotha Company. Other deviations consist in that it allots the dividends not exactly according to the surplus which is paid in each particular year, but from the existing surplus of several years combined disposes in each year of such a portion of the dividends as the directors may deem to belong to it; and that, with the extinction of the assurance, the proportion of the

dividends ceases for the years during which the assured has still paid the premium. The dividends—which every member, as in the Gotha Bank, enters upon with the sixth payment of premium—have fluctuated up to this time between 5 and 25 per cent., and amount on an average to 16 per cent., if we include both the years 1847 and 1848 in the account.

The Company undertakes assurances for lives, for terms of years, and for two lives, the last on condition that the sum assured should be paid on the death of the one dying first, and in sums of from 300 to 5,000 thalers (£43 to £714) on a single life. In case of withdrawal, it returns on whole life assurances one-third of the amount paid in.

The conditions of life assurance are nearly the same as those of the Gotha Bank; but in a new publication of the statutes, which up to the present time have remained unaltered, we expect stricter regulations as regards travelling, as well as, in some cases, of the return to be made in case of the cancelling of the assurance by suicide, military service, &c.

IV. The Hanoverian Life Assurance Company in Hanover (*Die Hannoversche Lebensversicherungs Gesellschaft in Hannover*), founded on the mutual principle in the year 1831, rests on a system of regulations differing from all other Companies, which is intended to avoid the heavy costs of management, and to confine the contributions to the limit of what is presumed to be actually necessary. It does not, therefore, as is usual, raise the average annual premium equalized throughout the whole duration of the life of the assured, and which, according to the risk of mortality increasing from year to year, requires the laying by of a corresponding reserve. The Hanover Company proceeds rather in the same way as the District Fire Insurance Funds, always ascertaining after the close of a year the amount required for the losses, expenses of management, &c. of the year, and dividing the contributions amongst the members according to a scale proportioned to their several ages, so that the older have to pay more than the younger, and each one just so much as the risk of mortality at the age at which he stands requires. From this it results that his contribution from year to year increases in that proportion in which he is exposed at every age to an augmenting risk. A limit, however, is placed to the excessive increase at the higher ages. From age 66, the factor of division for all later ages remains equal at 5¼ per cent. of the sum assured. To secure the continuance of this advantage, every member pays, on commencing his assurance, a single entrance fee, and everyone assured for

the whole life pays annually, during the first ten years of his membership, a proportionate extra premium. Out of the fund thereby formed, every one of the assured above 66 years of age will have made up to him the amount required beyond the proportion of 5¼ per cent. to complete the contribution, which he must pay yearly according to his actual age, and the risk of mortality corresponding thereto. Besides this, he must, as security for the punctual payment of the contribution to be called up at the end of each year, pay at the beginning of the assurance an advance to the funds to the amount of his probable first contribution. On the completion of the assurance, this sum is taken into account for his last contribution. The amount for every 100 thalers of sum assured, is—

Age.	Contributions Yearly.	Single entrance money.	Yearly extra payment for first 10 Years.
	£.	£.	£.
20	·861	1·052	·267
30	·979	1·542	·396
40	1·361	2·312	·594
50	1·920	3·604	·927
60	3·653	6·142	1·608
66	5·250		2·521

This contribution scale is computed on a table of mortality peculiar to the Hanover Company, derived from the combination of several older tables; namely, those given by Süssmilch and Baumann, but which still deviates materially from the well-known Süssmilch-Baumann tables of mortality, and shows relatively a much smaller mortality. The rates of contribution are only those required according to the table for the mortality per cent. corresponding to each age, increased by five per cent. for the expenses of management. At the age of 50, the table shows 68 deaths out of 3,718 living—equal to a mortality per cent. of 1·829, which, increased 5 per cent., = 1·920, being the rate of contribution at age 50.

The Company only undertakes whole life and short period assurances. The extent of the guarantee is somewhat more restricted than usual. Sea voyages are not included in the license to travel, nor are the assured to go beyond a distance of 150 miles from their residence. No return is made on a voluntary withdrawal from the Society, nor in case of death by suicide or duelling; but in the event of the assurance being invalidated by reason of travelling beyond the limits or by reason of military service, the entrance money only, with 2½ per cent. interest, is allowed.

Since 1848, the Company has abolished, to the evident interest of its members, a division which formerly existed of the Assurance Company into three different classes, in proportion to the sums assured, whereof each one had to contribute for itself to the required payments on death. The union now includes all the members alike; sums of from 100 to 3000 thalers (£14 to £429) may be assured on one life.

The practical consequences of this system of contribution will be felt in the payments of the members rising from year to year, and they will become very burdensome when they reach to the higher ages. The older members will have to pay much higher contributions for their assurances than according to the ordinary system of equal average premiums, since the representatives of those who have died early have received the amount assured, for which much smaller amounts of premiums have been paid. It appears to us that the costs of management are not much reduced thereby, since the payments in advance, the entrance money and extra payments, together with the interest thereon, form a fund for management which is very insignificant compared with that which might have been formed from the reserved fund from equal average premiums.

S. B.

(To be continued.)

On the Settlement of Losses by Fire under Average Policies. By Richard Atkins, Esq., *of the Sun Fire Office.*

It is a point well worthy of observation, that while England has been for centuries past so eminently practical in every branch of commercial enterprise, there have been but few attempts made until lately, to examine freely the well-worn rules of insurance business with a view to alteration. There has prevailed a general, and not altogether unwise, determination to let well alone, and quietly continue the system, however faulty, which experience had shown could lead to an ultimate and satisfactory profit.

Our continental neighbours, however, and especially our friends the Germans, have in modern times set a better example, and the pages of this *Magazine* continually give striking proofs of the careful manner in which facts are now collected on every hand, and brought forward for the purpose of scientific inquiry in all branches of the business of insurance.

There are, as is well known, two great varieties of policies

which are issued by Fire Insurance Companies, viz., the AVERAGE —or, as they are sometimes named, the FLOATING policies—and the SPECIFIED. The conditions of these two kinds are based upon widely different principles. The average policy has its own peculiar and distinctive characteristics, applicable to the largest mercantile transactions; and yet it is a remarkable fact that there does not exist any treatise for reference, or any embodiment of the laws by which such policies are practically regulated.

The settlements of claims for losses under average fire policies are often of a very complex and difficult character; and the general practical rules which govern these transactions are to be found only in the form of oral tradition, often forgotten, and still more frequently mistaken and misinterpreted. The fact that such vague guides have proved sufficient in these important affairs is testimony of a very striking kind to the generally honourable and equitable mercantile character of both assurers and assured.

In order to throw some light upon this most useful branch of fire insurance business, it may be worth while upon the present occasion to state concisely the existing practice, and the rules actually in operation, in reference to average policies, and at a future time to enter upon a brief critical examination of these rules, with a view to alteration and amendment. There may probably be but little novelty to many of our readers in these primary explanations; but they will at least serve to give a practical tendency to any future remarks that may be offered on this interesting subject.

It is quite necessary, in the first place, to fix the attention closely upon the broad and important distinction, already referred to, which exists in the settlement of losses under average and specified policies. These different, and not unfrequently contending principles, although very clear and simple when stated and considered apart, become in some of the various combinations of policies, so strangely complicated, that a constant reference to first principles is needed in order to disentangle them.

The practice of assurance against loss by fire on movable property took its rise in England at the commencement of the eighteenth century. The early contracts were issued by comparatively small bodies of speculators, who undertook to cover the risk of loss by fire as far as the total sum of a fixed and uniform policy, say of £500. The premium was paid by those who enrolled themselves in the shape of a stipulated quarterly subscription. There does not appear to have existed at the commencement any classifi-

cation of risk analogous to that which is now in current use, in the shape of a scale of premiums graduated according to the risk. The subscribers were probably confined to the proprietors of ordinary dwellings and shops, while all buildings and trades of a more hazardous description were altogether excluded from the subscription.

The great peculiarity of these primitive policies, in undertaking to pay all loss that might happen within the fixed sum of the policy, irrespective of the amount of property actually at stake, or of any salvage that might be made, has, amidst many changes, descended to the present times, and stamped a peculiar character on our modern practice. The ordinary condition of the policies known as *specified* policies, is to pay all the assured's loss as far as the entire sum insured, however short that may have been of the value of the property under the protection of the policy. This rule consequently abandons the whole of the salvage as the property of the assured, the only question involved under such policies being the production of adequate proof of the amount of actual loss.

The introduction of the average, or *pro ratâ,* condition is of more modern date. It is probable that this condition was introduced to meet the wants of the London merchants, who had then, as now, goods lying at the same time in different public warehouses, and on the quays, liable to sudden fluctuations and removals, which the owners sought to cover by what now pass under the title of average or floating policies.

The conditions of these policies are very dissimilar from those just described as the *specified;* the average condition being that the Office or underwriter shall be liable only to such a share of the loss as the sum insured may have borne to the value of the whole property covered at the time of the fire. This rule makes the assured his own insurer for the excess of value beyond the amount of the policy, and obliges him to bear the loss in the same proportion. The rule has consequently the effect of dividing whatever salvage may be made between the two parties in the proportion of the risks they have respectively run.

This average condition, which is known to be the universal condition of the marine policies of all countries, is based on such clear principles of equity, that it can create no surprise to find that it has been generally introduced into the practice of fire insurance wherever the Offices were unfettered by the ancient forms. Over the whole continent of Europe—in France, Germany, and Russia—

no fire policy is issued without that provision; while in the United States of America it also generally forms the basis of an insurance contract. The omission of it in any branch of insurance throws so great an advantage on the side of the assured in the settlement of claims, that it can be viewed in no other light than as equivalent to a very great, though unascertained, reduction in the rate of premium.

The two principles which respectively govern the settlement of losses under specified and average policies are remarkably clear and distinct. There is but little danger of any misapprehension arising so long as the claims for loss have simply to be regulated by either form of policy upon its own individual rule. Under the specified policy, the claimant makes out his statement of loss, without reference to the value of the property covered; and, upon verification of the claim, receives the whole sum up to the full amount of the policy.

Under the average condition, the Office requires from the assured, in addition to the statement of his loss, a valuation of the entire property under the protection of the policy at the time of the fire, and receives only such a proportion of his loss as the one may relatively bear to the other. If the assured has failed to cover the whole risk, he is considered as being his own insurer for the excess, and in that character bears his proportion of loss, or, what is equivalent, puts forward his claim for salvage only in the same proportion.

In order to prevent all risk of misapprehension, we think it best to insert a copy of the average clause, to which are added copies of the French and German forms of the same condition.

"It is hereby declared and agreed, that in case the property belonging to the insured in all the buildings, places, or limits herein described, shall, at the breaking out of any fire or fires, be collectively of greater value than the sum insured, then the Company shall pay and make good to the assured such a proportion only of the loss or damage as the sum insured shall bear to the whole value of the property aforesaid at the time when such fire or fires shall first happen. But it is at the same time declared and agreed, that if the within-mentioned assured shall, at the time of any fire, be insured in this or any other Office on any specific parcel of goods, or on goods in any specific building or buildings, place or places, included in the terms of this insurance, this policy shall not extend to cover the same, excepting only as far as relates to any excess of value beyond the amount of such specified insurance or insurances, which said excess is declared to be under the protection of the policy, and subject to average aforesaid."

Our French and German neighbours have a much more concise,

but not less clear statement of the same condition, as will be seen by the subjoined copies of their respective clauses.

"Si au moment d'incendie la valeur des objets couverts par la police est reconnue excéder le montant de l'assurance, l'assuré est considéré comme étant resté son propre assureur pour cet exédant, et il supporte en cette qualité sa part du dommage."*

"Wenn im Falle eines Feuers die versicherten Gegenstände mehr als die versicherte Summe betragen, und sie theilweise gerettet sind, so wird der Versicherte für so viel als sie mehr betragen, als *Selbst-Versicherer* angesehen, und trägt demnach seinen Antheil am Schaden pro ratâ."†

A first perusal of these different statements of the same principle will no doubt impress the reader greatly in favour of the concise and scientific expression of the French and German forms, contrasted with the somewhat diffuse and obscure phraseology of our own. Many of the chief difficulties which sometimes embarrass the subject are wholly removed, by reasoning on the sum left uninsured as though it were covered jointly with the Office by another Company or underwriter, that underwriter being the assured himself.

The expression of the condition might be varied, yet remain identically the same, by a declaration that the Offices and the assured were to partake of the salvage in the same proportion as the sums they respectively covered. The salvage when sold would equally diminish the loss, either in reducing its amount by previous deduction, or in making a subsequent *pro ratâ* division of the sum actually recovered from the fire.

The difficulties in the settlement of claims are in practice found to spring chiefly from the fact of the assured having effected policies of different kinds upon the same property, with different ranges of operation, and in various Offices. This may be done either through ignorance or with the design of gaining some supposed advantage, but is almost certain to produce great complication in case of loss. The mixed and often opposing liabilities of such policies give rise to cases in which it is exceedingly difficult, if not impossible, to find a really equitable principle of adjustment. The result has been, that some most arbitrary and oftentimes conflicting rules have been forced into daily use in the practical adjustment of losses. These rules have now to be considered.

* "If at the time of a fire the value of the objects covered by the policy is found to exceed the sum total of the insurance, the assured is considered as having remained his own insurer for that excess, and he is to bear in that character his proportion of the loss."

† "If in case of a fire the insured objects should exceed the sum insured, and they should be partly saved, the assured will be considered as self-insurer for the excess, and is to bear his share of the loss *pro ratâ*."

The obvious simplicity and equity of the average principle would appear at the first view to leave but little room for difficulty or misapprehension. In the simple forms of such policies they are rarely found to give rise to any discussion between the Office and the assured. The obscurity arises at the time when the assured for any reason obtains policies from the same Office, or different Insurance Companies, having different ranges of operation, thus bringing such policies into partial contact without the possibility of ever making them really concurrent.

One of the most common of these combinations is, where the assured has provided himself with a specified policy for the contents of a given warehouse, and afterwards taken out an average policy covering goods in that warehouse, and also in others named in that policy, the latter being subject to the condition of average.

This case being specially provided for by the second clause of the usual average clause, does not at the present moment call for any detailed inquiry. The rule acted upon by agreement in the settlement of losses is, that when a fire happens in the specified warehouse, the specified policy applying to that warehouse first enters into settlement, and bears the whole loss when that does not exceed the sum total insured. In cases where the sum of the specified policy is not equal to the loss, the average policy is brought forward in the second place, and pays its share of the residue of the loss in the proportion that the sum insured bears to the whole value of the goods covered in its range, after deducting the amount specially covered by the first policy.

Under the same policies, a loss happening in any other than the specified warehouse is settled by taking the entire value of goods under the protection of the floating policy, and allowing the amount of the specified policy to be deducted therefrom; the ordinary average calculation is to be made upon the remainder, and a *pro ratâ* share of the loss paid. It will not fail to be remarked, that while in the first case the specified policy is brought to bear all loss up to its full extent, in the second instance the amount of the specified policy is to be deducted from the total amount of goods covered. This is no doubt founded upon the consideration that such a portion was, by the operation of the rule, not really at any time under the protection of the floating policy, and may equitably be deducted from the amount of property covered in the settlement of a loss.

The case of a mixed insurance on a specific parcel of goods in a warehouse named, and a floating policy on merchandise, is treated

in identically the same manner. If the goods stated and declared are burned, the specified policy pays to its full extent, and the floating policy is brought in only for an average settlement in reference to the residue of the loss.

On the other hand, in case of a loss under the floating policy, all policies for identified parcels of goods, as well as the policies for specified warehouses, must be deducted from the estimate of goods covered, and the average calculation made upon the remainder after such deduction is made.

The next step in the inquiry leads to an examination of cases of much greater complication, and to difficulties which are not by any means so easy of solution.

The case of mixed specified and average policies having been provided for by a special clause, has not given rise to any practical difficulty, because all parties felt themselves bound in case of loss to submit to the stipulated condition. The injustice which the rule sometimes worked was rather between Office and Office than between the Office and assured, and little or no discussion has ever been provoked by the adoption of an admitted and declared rule.

It is, however, a matter of far greater complexity and embarrassment when two or more average policies covering merchandise in different ranges of warehouses, presenting as they generally do different proportionate liabilities, become united in the payment of a loss.

In order fully to appreciate the nature of the difficulty now under consideration in its most general form, let us examine a case commonly found in practice.

A merchant takes out three policies. One, in Office S, for goods deposited at a wharf named; in Office P, for goods at the same wharf, or in the London Docks; in Office A, for goods lying in all or any warehouses in the Port of London, including in the range both the former.

It is clear, in the first place, that a loss happening at the wharf, all three Offices, S, P, A, have a joint but wholly disproportionate interest. In the second place, if the loss happen in the docks only, P and A are concerned in it, but with widely differing averages. Thirdly, if the loss arises in neither the wharf named, nor the docks, but in some other warehouse within the limits of the policy, the Office A is solely interested in the loss; and yet, if the assured is to obtain an equitable settlement of his claim, the policies of S and P cannot be altogether left out of the question, as

they have each covered to a certain extent a portion of the goods included in the range of the policy of Office A.

No provision has ever been formally introduced into mercantile floating policies to meet this exigency, and settle the joint liabilities of such policies, covering different ranges, and consequently with very different bases for the settlement of claims. As cases have arisen, they have been met in an equitable, if not liberal, spirit in reference to the assured; while between the Offices interested, the practice has settled down into the adoption of the following rule:—That the policies with the most limited ranges should all be treated as specified policies in the order of their extent, and be called upon, in the first instance, in that order to make a settlement of the loss; while those of greater extent are only brought forward in the same order to cover any excess of loss which may be left after the prior settlement made by those with lesser ranges. In a word, the floating policies of less extent or range are placed in the position of specified policies on parcels of goods, or goods in specified warehouses, as described in the second condition of the average clause, and are, in point of fact, to be treated in the same manner in the order of their extent—the policy with the least extensive range being held to be more specified than any of greater extent; and in this view all are to be brought forward in the order of the magnitude of their respective ranges, for the payment of losses.

With a view to explain the operation of the rule, one or two cases of a very ordinary kind are added, an analysis of which will serve as a key to the solution of almost every combination that may be suggested.

The assured has goods lying at the following places: viz., at a specified wharf,—at the London Docks,—and in the public warehouses generally situated within five miles of the Royal Exchange. He has opened policies to cover the risk in the following manner: In Office S £2,000, limited to goods on the wharf specified; in Office P £1,000, covering goods at the same wharf, and also in the London Docks; in Office A £3,000, as a floating policy to cover goods lying within five miles of the Exchange of London. The merchandise owned by the assured is distributed as follows: £4,000 at the wharf; £1,000 in the docks; and £2,000 in the public warehouses generally.

A loss may happen in any one of the three places, and give rise to three perfectly distinct calculations.

Case 1.—Loss on goods at the wharf.

	Property.	Loss.	Insured in S.
Wharf	£4,000	£3,000	£2,000

S pays one-half, or £1,500.

	Property.		
Wharf and docks . . .	£5,000		
Deduct insured in S . .	2,000		
	£3,000	Residue of Loss. £1,500	Insured in P. £1,000

P pays one-third of residue of loss, or £500.

	Property.		
Wharf, docks, and other warehouses,	£7,000		
Deduct insurances in S and P .	3,000		
	£4,000	Residue of Loss. £1,000	Insured in A. £3,000

A pays three-fourths of residue of loss, or £750.

Thus the Offices S, P, and A pay conjointly under their separate liabilities £2,750, and the assured loses by short insurance £250.

Case 2.—Where, with the same policies and distribution of property, the loss happens in the docks.

	Property.		
Wharf and docks . . .	£5,000		
Deduct wharf insurance in S .	2,000		
	£3,000	Loss in Docks. £600	Insured in P. £1,000

P pays one-third of loss, or £200.

	Property.		
Wharfs, docks, and warehouses .	£7,000		
Deduct insurances in S and P .	3,000		
	£4,000	Residue of Loss. £400	Insured by General Floater in A. £3,000

A pays three-fourths of residue of loss, or £300.

Thus P and A pay together £500, and the assured loses by short insurance £100.

Case 3 happens when, with property and insurances the same as previously supposed, the loss occurs in a public warehouse to which the floating policy of Office A only applies.

	Property.		
Wharf, docks, and warehouses,	£7,000		
Deduct insurances in S and P .	3,000		
	£4,000	Loss in a Public Warehouse. £2,000	Insured in A. £3,000

A pays three-fourths of loss, or £1,500,

the assured losing by short insurance £500.

An attentive consideration of these cases, which may arise out of one set of policies, will furnish a very clear idea of the nature of

the embarrassments which sometimes arise in the settlement of this class of claims, and point out also the methods actually in practice for adjusting them. It is particularly desirable to direct attention to the deduction of the sums of the policies of the lesser ranges from the total amount of property covered when the claim is made under policies of an extent greater than their own. This point of practice is open to some very weighty objections, and may call for future notice; but at the present moment it is sufficient to say that the rule as explained is generally adopted and acted upon in the settlement of average claims.

As no benefit whatever is likely to arise from multiplying examples to illustrate the same point, it may be interesting to quote a very remarkable settlement of the kind, now under consideration, which not long since took place at Liverpool, and in which, after close inquiry, the rule as stated was adopted by all parties as the basis of settlement.

Settlement of Messrs. A and B's Claim for Loss by Fire on 346 Bales of Bowed Cotton, lying in Haywood's & M'Vicar's Shed, William Street, Liverpool.

		£.	s.	d.
Total loss, per invoice lodged with the Royal Assurance Company, cash, 9 November, 1849		2,794	3	0
Total property, per declaration . .	£374,996			
Specific insurances	90,000			
Leaving to be covered by certified floaters		284,996	0	0
Of this sum there is declared to be in the Albert Dock warehouses only		£21,750	0	0

The "first average" will therefore be upon policies *that do not extend to the Albert Docks.* Thus—

£285,000 stock in certified warehouses and Albert Docks.
21,750 stock in Albert Docks.

£263,250 : £65,000 :: £2,794. 3*s.* = £. 689 s. 18 d. 4

Of this—		£.		£.	s.	d.
Liverpool	on	30,000	pays	318	8	5
Imperial	„	10,000	„	106	2	10
Alliance	„	5,000	„	53	1	5
West of England . .	„	5,000	„	53	1	5
Guardian	„	5,000	„	53	1	5
North of England . .	„	5,000	„	53	1	5
Phœnix	„	5,000	„	53	1	5
		£65,000		£689	18	4

Carried forward . £689 18 4

	£.	s.	d.
Brought forward .	689	18	4

The "second average" will then be upon policies including Albert Docks and certified warehouses. Thus—

£285,000 stock in certified warehouses and Albert Docks.
Less 65,000 of first average policies.

£220,000 : £115,000 :: £2,104. 4*s.* 8*d.* = 1,099 18 10

Of this—		£.		£.	s.	d.
Liverpool	on	10,000	pays	95	12	11
Alliance	„	35,000	„	334	15	3
West of England	„	25,000	„	239	2	5
Guardian	„	15,000	„	143	9	6
North of England	„	5,000	„	47	16	5
Phœnix	„	5,000	„	47	16	6
Atlas	„	5,000	„	47	16	5
Sun	„	5,000	„	47	16	6
Yorkshire	„	5,000	„	47	16	5
Globe	„	5,000	„	47	16	6
		£115,000		£1,099	18	10

The "third average" will then be upon policies including Albert Dock warehouses, transit-sheds, Birkenhead Docks, and all certified warehouses. Thus—

£285,000 in all such places.
Less 180,000 first and second averages.

£105,000 : £60,000 :: £1,004. 5*s.* 10*d.* = 573 17 8

The Royal paying the whole.

The "fourth average" will then be upon general floating policies. Thus—

£285,000 in all warehouses.
Less 240,000 first, second, and third average policies.

£45,000 : £10,000 :: £430. 8*s.* 2*d.* = 95 12 9

Of this—		£.		£.	s.	d.
Alliance	on	5,000	pays	47	16	4
Phœnix	„	5,000	„	47	16	4
		£10,000		£95	12	8

Uninsured . .	£35,000 loses . . .	.	334	15 5
			£2,794	3 0

RECAPITULATION.

		£.	s.	d.	£.	s.	d.
Liverpool	under first average, pays	318	8	5			
	" second " "	95	12	11			
					414	1	4
Imperial	" first " "				106	2	10
Alliance	" " " "	53	1	5			
	" second " "	334	15	3			
	" fourth " "	47	16	4			
					435	13	0
West of England	" first " "	53	1	5			
	" second " "	239	2	5			
					292	3	10
Guardian	" first " "	53	1	5			
	" second " "	143	9	6			
					196	10	11
North of England	" first " "	53	1	5			
	" second " "	47	16	5			
					100	17	10
Phœnix	" first " "	53	1	5			
	" second " "	47	16	6			
	" fourth " "	47	16	5			
					148	14	4
Atlas	" second " "				47	16	5
Sun	" " " "				47	16	6
Yorkshire	" " " "				47	16	5
Globe	" " " "				47	16	6
Royal	" third " "				573	17	8
Uninsured					334	15	5
					£2,794	3	0

It will not now be necessary to add anything for the purpose of explaining the existing practice. The merits and defects of these methods of settlement may be brought under review at a future opportunity.

FOREIGN INTELLIGENCE.

AMERICA. — *Philadelphia. — Centennial Meeting of the Philadelphia Contributionship for the Insurance of Houses from loss by Fire, April,* 1852. — This being the hundredth anniversary of the organization of the Company, the Chairman of the Board of Directors, Horace Binney, Esq., delivered an address giving a succinct and interesting sketch of the origin, progress, and present state of the Company, and of the statistics of insurance against fire both in America and Europe. We propose to give such portions of this address as may more clearly show the introduction and progress of fire insurance in America. After describing the manner in which assurance in various branches had sprung up in Europe, Mr. Binney proceeds—

"Mr. Chairman,—I have made these remarks to enhance in some degree the merit of the men who established this institution in the year 1752. If they were not the first to introduce insurances against loss by fire to houses and buildings anywhere, they were the first to introduce them into this country. After some inquiry, I am satisfied that fire insurance was not known among us before that year. Marine insurance was practised here as early as 1721, for a broker's office for effecting such insurances is advertised of that date in a Gazette of this city; but policies against fire were not known. The earliest incorporation for fire insurance in Boston took place in 1795; and I am informed that private policies against the risk were previously unknown there. All the world seem to have come tardily into the use of this most important security; and yet the risk has been coeval with society. The use of it in Paris precedes us but half a dozen years; and in regard to Holland, with whom our early relations were more intimate than with any other people of the Continent, the Hollanders were not only not before us, but they are, I believe, still behind us, and behind the rest of the world; and they have positively discouraged the practice, under the narrow view that it increases the negligence of people in guarding against accidents by fire, and promotes *incendiarism and fraud.* There may be, and certainly are, such incidents to it; but how small the evil of them, compared with the immense beneficence of the general practice!"

The name of Benjamin Franklin appears amongst the first directors of this Company.

"The name first subscribed to this deed of settlement is that of James Hamilton, the Lieutenant-Governor of the Province under the Proprietaries. It was the name of a public officer, announcing the approbation and favour of the government, but indicating no special participation in originating the Company. The first private name is that of *Benjamin Franklin* — private in the unofficial sense, but publicly known in the Colonies, and thereafter to be universally known among men. His name stood also at the head of the directors chosen at the first election. They were Benjamin Franklin, William Coleman, Philip Syng, Samuel Rhoads, Hugh Roberts, Israel Pemberton, Jr., John Mifflin, Joseph Morris, Joseph Fox, Jonathan Zane, William Griffitts, and Amos Strettell—a list which contains names of some of the most respected citizens of Philadelphia, whose descendants are still amongst us, and are personally esteemed and honoured. The first treasurer chosen for the same period was John Smith; and among these men I think we are to look for the originator or introducer of this plan of insurance."

"Dr. Franklin's name was a sanction for this undertaking; and whosesoever was the first thought, his was the adoption and recommendation of it as a good thought, and this merit must undoubtedly be accorded to him. In the first outset of the Company he gave attendance at the meetings of the directors, and so co-operated with them; but the minutes, which the Office now possesses from the beginning, and which have been always kept with great distinctness, furnish no traces of his particular action in its concerns. After his re-election in 1753, he attended more rarely, and must have been a pretty large contributor to the fund of absentee fines; and he ceased to be a director after the close of the second year.

"Instead of this distinctive name as the author of the plan, there seems to be at least as much reason for attributing it to a gentleman who, from the extraordinary increase of his denomination in modern times, would now be considered as having no

name at all—*John Smith.* He was, however, as is still well known, and almost remembered, a man of property, who took an active part in the institution and promotion of other establishments for the benefit of the city—a merchant, occupying a large and well-furnished brick house in a quarter of the city where the most affluent families had their residence at the time, and who, from his profession, was likely to be acquainted with the usage of insurance against maritime risks, and in frequent connection with the mother country, where fire insurance was practised. He was the first treasurer of the Company, the responsible depository of the funds, the unpaid agent for several successive years in the receipt, disbursement, and investment of the deposits or premiums. He was the main executive officer; and until after the Company was thoroughly set agoing, he did not retire from its service, and then he carried with him the thanks of the directors. He was also the first person who insured with the Company to give it a start, and made a second insurance in advance of any other person. The surveys of his two brick houses, three stories high, are No. 1 and 2, of the first of June, 1752. The originals are now in the office, and I will read No. 1 as a formula of the early surveys.

'*Surveyed* June 1st, 1752.

'At the request of *John Smith*, Merchant, his dwelling-house on the east side of *King* Street, between Mulberry and Sassafras, 30 feet front, 40 feet deep, brick, 9 inch party walls, 3 storys in height, plaistered partitions,

open Newel bracket stairs, penthouses with board ceilings, garrets finished, 3 storys, painted brick kitchen, 2 storys in height, 15 ft. 9 front, 19 ft. 6 deep, dresser, shelves, wainscot closet fronts, Shingling ½ worn.

He proposeth to assure five hundred pounds hereon.

'We judge the above house and kitchen to be worth £1000.

'Jos. Fox,

'£500. (a 20 s. per ct.) 'Samuel Rhoads.'

"The dwelling-house of John Smith, you see, was a considerable house for any time of day, and especially at that time; and *King* Street was, in 1752, a fashionable street, with a loyal name. The King's name was then in the mouths of all the people. It was a tower of strength. But the 'gentry' have disappeared from the street, and the name of the street has disappeared, and the strength of the name has ceased among us, and it is now diluted to *Water.* If the authorship of a scheme is to be inferred from readiness to bear its heaviest burden, from constancy in bearing it, and from priority in professing and proving his confidence in its working, *John Smith*, the nameless, has better pretensions to that merit than some of the more individuated names in the Company. His descendants I believe are among us, and are in great esteem; but who shall declare the generation of the *Smiths*, and especially of the John Smiths?"*

"At that day, the virtue of punctuality was esteemed at least as highly as it is now; but both then and now, appliances of some kind were, and still are, necessary to secure it. Punctuality at the monthly and other meetings of the directors was at that time secured or promoted by a fine upon the absentees—two shillings upon the director who did not attend at all, and half that sum upon him who was absent at the appointed hour of meeting. A remembrancer of a different kind has been substituted in modern times. In London, I believe, the modern expedient in similar cases, Life Insurance Companies in particular, is to pay a guinea to those who give full attendance. Our fashion here, is to give at the monthly meeting a reasonably good dinner and a segar. The other meetings, which in the form of committees are frequent and almost daily, are performed *fasting.* But while we know how this remembrancer is disposed of by us, and may conjecture how the London guinea or sovereign is disposed of, what do you suppose was the use to which our forefathers applied that fund of treasury fines which was accumulated by the defaults of the directors? I will give you any time you please to guess—either the thing itself, or the *species*, or even the *genus* of it. It had no relation to burning or to building, to eating or to drinking. It was the reverse of bread to the poor, and it conveyed neither pleasure nor instruction to the young, nor indeed to anyone who minded his own business and stayed at home, as I dare say the directors themselves did. But it was a public-spirited use, and in the true utilitarian temper of the day, and was of unspeakable comfort at times to the weary wayfarer, especially when the roads were founderous, and

* "Since these remarks were made, I have learned from the grandson of this gentleman, John Jay Smith, Esq., the Treasurer of the Philadelphia Library Company, that the prominency or leading interest in the concern, which upon probabilities I had attributed to his ancestor, is proved by an original journal and other papers still in possession of his descendants."

the only comfort on the way was to know how much you had ploughed of the journey, and how little of it remained to be ploughed. They invested their exchequer in *milestones*, numbered consecutively, and planted them from the intersection of Front and High Streets to the river's edge opposite Trenton, in New Jersey; and having gained in accurate measurement by the Surveyor-General of the Province two miles in the estimated distance, they planted the stone numbered 29 miles from Philadelphia, at the distance of four chains from the edge of the Delaware, and gave the two supernumerary stones which they had provided to somebody else, to prosecute the good work further on. This work was begun by a committee of the directors at 5 A.M. on the morning of the 15th May, 1764, and it was reported on the 17th of the same month to the Company as completed. In a subsequent year, when the treasury had again become raised up by means of the same *vacuum* in attendance, they pursued the like work towards the boundary of the province in the direction southward towards New Castle, Delaware. The blessing of the traveller upon him who first invented milestones, certainly did not fall upon them; but theirs was the first application of the invention in this quarter of the world, and deserves at least half of the blessing."

The following remarks on the calculation of the probabilities of fire risks are worthy of attention, considering that hitherto scarcely any reference has been made, except in articles in this Magazine, to ascertaining the average from recorded experience, nor have any facts been yet made public in England from which true premiums could be deduced.

"Looking casually at the risk of fire to houses and merchandise, either as to its happening at all or as to the extent of injury when it does happen, an uninstructed observer might be disposed to say that there is no rule about it; it is a matter of mere *chance*; there is no such thing as estimating the risk of fire in such a city as Philadelphia, and particularly the extent of loss by fire. A fire happens one day, and it does not happen the next. The element sleeps one month, and rages another. It desolates the city in one year, and is moderate and governable for some years afterwards. It destroys one house, or a dozen; it half destroys another house, or another dozen; and it scorches or slightly burns one, or a dozen, or fifty others. The facts are so. There is no doubt about it. Partially observed, they appear to sustain the objection that it is all *chance*, and that there is no rule about it. But philosophically speaking, there is no *chance* in the matter. There may be what are called *chances* of its being so, and not otherwise; but these *chances* resolve themselves to the observer, after long, extensive, and accurate observation, into what are called *probabilities;* and as effects follow their causes, if the same causes remain the same effects will follow, and at length a rule may be deduced from a great mass of observations, that deserves the name, and gives the assurance, of great or high probability, that a certain or nearly certain proportion of fires will happen in such a city, in a year or other given time, and that a certain proportion of losses, total, severe, or slight, will happen in a given time, a week, a year, or a century; and the average of the whole may be practically ascertained, near enough for the adjustment of premiums upon the whole city, if the whole is insured, or, by a proper calculation of probabilities, for a portion of the city, if a portion be insured.

"But who had this mass of observations, in the early days of the Company? Who among us has made them now, after the lapse of a century? The experience of many years in a single Company may undoubtedly be something; but if we advert to the experience of past days, and especially to the experience of this present day of dividends pretermitted, of undisclosed encroachments upon capital, and of unknown proportions between amounts insured and of capitals or reservations to protect them, we should say it does not amount to much. If all the Companies were to club all their experience, and give it to the public, it might amount to more; but I am not sure that the aggregate would be worthy of entire reliance. The best experience we have is limited in point of time. It is also limited in point of range. I will give my reason for thinking so presently. One thing, however, is certain. If it is not more certain philosophically in the case of a Company taking long risks than it is in the case of every Insurance Company constantly, from year to year or month to month, taking short risks, it is at least more apparently certain in the case of such a Company as this, which makes only permanent or perpetual insurances upon brick and stone buildings; and that certain thing is this, that nothing but long-extended and accurate observation of losses by fire will answer for such a Company as this. One with another, the policy remains upon the building for the whole term of its existence. We insure it, as it were for the life of the house, from seventy-five to a hundred years, more or less; and we take the risk of fire to that house, and of consequent

loss, for the whole of that time. And so we do of all the houses we insure. Surely, to do that with safety to the Company, we should be able to estimate the probability of loss, not from the occurrence of a few years, but of a great many, of a century even; from such a term, in fine, as will give us a near approach to the law of this species of disaster for the whole time."

"The rates of insurance in that early day (about 1763) varied considerably from the present. The Company insured brick and stone houses in good positions, for twenty shillings in the hundred pounds (that is to say, upon a deposit of one per cent.), the party insured retaining the right to a return of that deposit on the expiration of the policy, if the general losses did not exceed the interest, and the Company enjoying as the premium of insurance only the use or interest of the deposit, to go into account against the losses and expenses for the proportional benefit of all the members. At the legal rate of interest in the Colony, six per centum, this was equivalent to an annual deposit of one shilling and two pence farthing on the hundred pounds, or six cents on the hundred dollars. In some instances they insured for as low a deposit as seventeen shillings and sixpence on the hundred pounds. They insured brick houses with a joiner's or cabinet-maker's workshop in them, at two per cent. For good risks they rarely exceeded twenty-five and thirty shillings, that is to say, 1¼ to 1½ per cent. deposit. Until the deed of settlement was so altered in April, 1769, as to prohibit insurances on wooden buildings, they insured even such buildings upon a deposit of three per cent. It strikes me the more as remarkable, because I find that in the first English Insurance Company, in 1696, when the rate of interest in England was the same, namely, six per cent., the lowest rate of premium, upon the least hazardous buildings, was an annual premium of *two shillings* in the hundred pounds. How subsequent experience has modified this rate in London, I am unable to say; but I find one recorded instance of insurance of a house, perhaps of the second class, in 1739, on an annual deposit of three shillings in the hundred pounds, and another, on a first class risk, in 1789, at two shillings. The lowest premium on a first class building appears at that time to have been the rate I have just mentioned. The average of all the premiums of all the insurances in our own Company, in 1753, the end of the first year, was but 1·17 hundredths per cent.; and in 1763, at the end of ten years from that time, but 1·44 hundredths per cent. The average of the rates appears to have gradually risen, up to the present time, the best class at the present time being about two per cent. deposit, though some of the old risks still remain lower; and I may state the average of all our insurances as being 2·51 per cent. in 1822, 2·58 in 1832, 2·63 in 1842, and the same in 1852."

We conclude with the following valuable suggestions on collecting observations with regard to fire risks:—

"But cannot a rule be obtained by observation and inquiry? Must we continue in the present state, when few, and it may be none among us, can give a plain and defensible reason for naming a given rate of insurance as that which, if applied to a considerable mass of transactions, will most probably meet the loss on the kind of property insured for one year, or for ten years, or for an unlimited term, and also pay expenses and leave a fair profit to the insurers? Cannot the Companies, by united observations accurately and minutely made, and prosecuted for a considerable number of years, come to the knowledge of such facts as will furnish a defensible reason for naming a certain premium for insuring property of a given description against the risks of fire in a given place? It is the opinion of scientific men, I believe, that by observing the course of events extensively and accurately, such knowledge may be acquired, and with it a rule of insurance, at least approximately sufficient for practical use. In the opinion of such men, it is possible to obtain what may be called the *law* of any species of disaster in the place of observation, and in regard to fire something like a mortality table, a table of injury as well as of mortality by that element, in the case of houses and merchandise, and its variations in the case of particular trades, and in the different conditions of the agents and apparatus for arresting and extinguishing fires. Even a year's accurate observation may do something, though perhaps little; ten years' observation may give a sensible approximation to a rule; and a century may give even the larger variations, the plague and cholera losses, as I have called them. But the time it may take is nothing. The observations should be begun at once, and never cease, because new circumstances are constantly occurring to increase or diminish the risk of fires, and all of the phenomena should be constantly and regularly observed. It is the duty of the present day to begin. It will be the duty of that which succeeds to follow on. We should constantly keep company with all the changes in the place, its extension, the heights and materials of its buildings, the merchandise contained in them and its liability to spontaneous combustion and explosion, the nature and management of dangerous trades, the character of the firemen and their appa-

ratus, the methods of warming and lighting the dwellings and warehouses, even such matters as the matches and means of kindling a light, the loco-focos and lucifers which are one of our most operative dangers; in fine, daily and regular observation should be applied to everything that can be supposed to affect either the occurrence of fire or its intensity. All these things should be observed in their results from time to time continually. Is there any doubt that this can be done—I mean, that the observations may be made? There is none whatever; and it cannot demand an expenditure which the united Companies cannot both conveniently and profitably afford. Is there any doubt that a close approximation to a true rule for the future may be so obtained? Upon the authority of wiser persons, I believe there is none."

FRANCE.—*Operations of the French Proprietary Fire Insurance Companies for the Year* 1851.—We have received from our able correspondent at Paris, M. Maas, the following summary of the operations of the French Proprietary Fire Insurance Companies for the year 1851:—

Name.	Sums Assured.	Premiums received in the year.	Interest, &c.	Losses.	Expenses and Commission.	Dividends paid.	Profits reserved.	Capital of the Company and Reserve.
	£	£	£	£	£	£	£	£
Nationale	185,261,502	145,978	8,948	70,060	47,880	36,000	..	520,000
Générale	171,751,572	137,800	7,421	56,816	51,315	27,000	9,000	200,120
Phénix	143,327,364	141,197	8,082	63,209	49,575	28,800	4,200	240,000
Union	86,686,275	77,400	5,108	25,432	27,799	20,000	3,000	445,400
Soleil.....	75,274,811	73,123	1,360	29,539	20,750	4,000	„	240,000
France	93,023,250	81,194	4,201	28,534	31,625	12,000	5,956	424,000
Urbaine.....	87,708,920	74,369	5,260	31,917	30,229	4,000	4,000	216,000
Providence	57,453,572	45,704	1,879	20,188	20,829	2,800	2,495	202,880
Palladium	55,086,302	55,586	338	28,143	26,185	„	„	200,000
Other Companies	63,366,988	61,539	2,767	28,575	24,719	1,200	1,200	„
	1,018,940,556	893,890	45,364	382,413	330,906	135,800	29,851	2,688,400

By comparing this Table with one for the year 1850, given from the same authority, vol. i. p. 307 of this Magazine, the assurances will appear to have increased more than £50,000,000. The amount of premiums received was in nearly the same ratio, being ·0877 per cent. on the sum assured in 1851, compared with ·085 per cent. in 1850. The losses in 1851 were ·0375 per cent. of the total sums assured, or 42·8 per cent. of the premiums received; and in 1850 they were 50·18 per cent. on the premiums received—showing a considerable difference in favour of the Companies last year. The proportion of expenses was almost the same in both years, being 37·02 in the latter and 37·125 in the former. The dividends to the shareholders have been greater in the year 1851 as compared with 1850, in the proportion of 15·19 per cent. of the premiums to 12·85 per cent.

GERMANY.—*Summary of the Operations of the Principal German Fire Insurance Companies in the Year* 1851.—Although the business as regards profits, through the lowering of premiums and the competition of the Companies against each other, continually threatens to lose the solid character which it has always maintained in Germany, this important branch of business has in the last year extended its usefulness, and protected thousands of families from poverty. With regard to profits, this year is on the whole not an unfavourable one, as will appear from the following summary, although the Companies have shared in profits in very unequal proportions.

Name of Company.	Share Capital.	Sums insured in the Year.	Premiums. (a) Gross. (b) Clear of Charges.	Losses & Charges, including Agency.	Premium Reserve, and Reserve Fund.	Current Risks at the end of the Year.	Dividend paid per Share.
	£	£	£	£	£	£	£
Aachen-Münchener Feuer Versicherungs Gesellschaft	428,571	75,425,949	*134,615	77,106	273,027	70,555,316	7·143
Assicurationi Generali, in Trieste	133,333	19,729,584	101,578	¶91,214	101,487	unknown	7·5
Azienda Assicuratrice, in ditto	100,000	21,225,023	34,361	27,037	24,319	11,868,582	4·075
Berliner Feuer Versicherungs Anstalt	121,429	3,979,831	*9,767	4,498	40,244	unknown	
Borussia, in Berlin	254,139	*6,942,857	*20,861	21,431	10,786	unknown	
Colonia, in Köln	428,571	*55,876,571	*100,137	66,935	140,832	47,758,347	6·
Compagnie von 1843, in Hamburg	37,500						
Erste Osterreichische Versicherungs Gesellschaft, in Wien							
Hypotheken und Wechsel Bank, in München	250,000	..	†32,284	24,921	52,125	14,259,923	unknown
Leipziger Feuer Versicherungs Anstalt	142,857	*25,258,429	*50,517	35,036	87,979	unknown	7·143
Magdeburger Feuer Versicherungs Gesellschaft	142,857	‡55,284,827	*54,176	35,456	38,264	11,733,427	4·286
Phönix, in Frankfurt							
Preussen National Versicherungs Gesellschaft, in Stettin	428,571	13,425,416	32,946	§35,429	36,258	unknown	1·214
Riunione Adriatica, in Trieste							
Schlessische Feuer Versicherungs, in Brealau	285,714	11,601,415	*38,160	‖32,143	18,685	5,717,867	2·429
Vaterlandische Feuer Versicherungs Gesellschaft, in Elberfeld	..	*24,214,714	b26,796	24,361	38,425	17,869,219	2·429

* Sums thus marked are approximative only.
† Includes proportion of fire losses from Reassurance Companies.
‡ £39,833,985 of this is for short terms and transport insurance.
§ Including £3,500 reinsurance, and also the reserve for river and sea insurance.
‖ Including £11,499 reinsurance premiums.
¶ Including an unknown amount for reinsurance.

Cologne.—Agrippina See Fluss und Land transport Versicherungs Gesellschaft in Köln—Seventh Annual Account, for the year ending 31st December, 1851.

	£.	£.
Receipts.		
Balance from 1850	61	
Brought forward from 1850 for unsettled losses and current risks	9,214	
		9,275
Premiums and policy money	29,587	
Interest	1,720	
Profits from goods	41	— 31,348
		40,623
Expenditure.		
Returns and allowances	981	
Agents' commission and brokerage	1,875	
Reinsurance premiums	9,264	
Losses paid, exclusive of the proportion reinsured	10,117	
Costs of management, salaries, printing, postage, advertisements, travelling	1,318	
Depreciation of furniture	16	
Banker's charges, &c.	41	— 23,612
Balance		17,011
Reserve for current risks, unsettled losses, and other liabilities		11,214
Surplus		5,797
Carried to reserve fund		714
Clear profit		5,083
Dividend 15 per cent. for security, and to the Manager, as per statutes	762	
Dividend declared at the general meeting, 15 per cent. on the amount paid up on 2000 shares	4,286	
Contribution to the Cathedral Building Fund, according to the resolution of the General Court	35	
		£5,083

Cologne.—Fire Insurance Company Colonia. (Feuer Versicherungs Gesellschaft Colonia.)—Summary of the Report presented at the Twelfth General Meeting, held 3rd April, 1852.—The manager presented the report on the position of the Company at the close of the year 1851. On the 31st December the insurances in force amounted to £47,758,347. The profit and loss account, after a proportionate addition to the reserve, shows a surplus of £18,000, which will afford to the shareholders a dividend of £6 per share. The account is as follows:—

		£.			£.
Claims paid after deduction for reinsurances, costs of management, agencies, and expenditure for general purposes		66,935	Brought forward from 1850	40,943	
Interest paid (£1. 3s. per share)		3,428	Premiums retained for current risks for 1851	55,265	
Reserve for dividend of £6 per share		18,000			96,208
Reserve for unsettled losses		5,200	Reserve for unsettled claims		4,480
Capital	£58,943		Premiums for 1851, including premiums received in former years for 1851	111,753	
Premiums retained for current risks for 1852	58,535		Of which premiums received in 1851 for future years	11,616	
		117,478			100,137
			Interest received		10,216
		£211,041			£211,041

Capital, reserve, and premiums for 1852, brought down	£117,478
Reserve of premiums received for future years	23,354
	£140,832

Lubeck.—Balance Sheet, 31*st December,* 1851, *of the New Insurance Company of* 1847, *against Fire Risks. (Neue Versicherungs Gesellschaft gegen Feuers gefahr von* 1847.)

Debit.	£.	*Credit.*	£.
Total amount of share capital (820, at £51 each)	41,820	By capital (820 shares, at £60)	49,200
Cash invested	10,119	Premium account	2,595
Cash account	183	Interest account	327
	£52,122		£52,122

Balance Sheet.

		£.	£.
Balance from premium account, 1850			2,283
Premium receipts for 1851:—	£.	£.	
Assurances more than one year	13,413	81	
" for one year	234,216	361	
" for short terms	45,902	36	
	£293,531	478	
Deduct two losses	£39		
" stamps	21		
" costs of management, registration, printing, &c.	106		
		166	
			312
Balance of premium account			2,595
Balance of interest account from 1850		217	
Received for interest in 1851		368	
		585	
Deduct interest to shareholders		258	
Surplus of interest (not including proportion due)			327
			2,922
Reserve for current risks, amounting to £381,362			642
Remaining as surplus			£2,280

Return of the Casualties which have occurred in the Mines of the Prussian States in the Years 1841 *to* 1849, *in comparison with those which have taken place under like conditions in the Kingdom of Belgium.*

Year.	Silesian Mining District.			Saxo-Thuringian Mining District.			Westphalian Mining District.			Rhenish District.			Rüdersdorf Mining District.			Total in the Prussian States.			In the Kingdom of Belgium.			Hence, on the average, to 1,000 Workmen in the Prussian States (more) (less).
	Number of Casualties.	Number of Workmen employed.	Proportion of Casualties to 1,000 Workmen.	Number of Casualties.	Number of Workmen employed.	Proportion of Casualties to 1,000 Workmen.	Number of Casualties.	Number of Workmen employed.	Proportion of Casualties to 1,000 Workmen.	Number of Casualties.	Number of Workmen employed.	Proportion of Casualties to 1,000 Workmen.	Number of Casualties.	Number of Workmen employed.	Proportion of Casualties to 1,000 Workmen.	Number of Casualties.	Number of Workmen employed.	Proportion of Casualties to 1,000 Workmen.	Number of Casualties.	Number of Workmen employed	Proportion of Casualties to 1,000 Workmen.	
1841	14	9,680	1·45	5	3,884	1·28	23	8,568	2·68	43	17,387	2·46	..	..	..	85	39,519	2·15	83	37,629	2·20	− 0·05
1842	23	10,430	2·21	3	4,109	0·73	12	8,831	1·36	32	18,550	1·73	1	120	8·33	71	42,040	1·69	40	39,902	0·95	+ 0·74
1843	14	10,456	1·34	4	3,994	1·00	11	8,931	1·23	23	17,661	1·30	1	130	7·70	53	41,172	1·29	28	37,503	0·75	+ 0·54
1844	17	11,035	1·55	6	4,192	1·43	16	9,679	1·65	30	17,070	1·76	1	188	5·30	70	42,164	1·68	46	38,490	1·20	+ 0·48
1845	8	12,186	0·66	12	4,308	2·79	22	10,156	2·17	29	18,582	1·56	..	316	..	71	45,548	1·56	83	41,359	2·00	− 0·44
1846	24	12,953	1·85	6	4,535	1·32	18	10,713	1·68	54	20,523	2·63	..	331	..	102	49,055	2·08	64	45,488	1·41	+ 0·67
1847	26	13,428	1·93	8	4,653	1·72	25	11,619	2·15	36	22,044	1·63	2	502	3·98	97	52,246	1·86	98	48,847	2·01	− 0·15
1848	25	12,147	2·06	7	5,010	1·40	20	10,648	1·88	26	19,101	1·36	3	550	5·45	81	47,456	1·71	80	44,177	1·81	− 0·10
1849	21	11,550	1·82	4	5,061	0·79	21	12,122	1·73	18	18,846	0·95	2	637	3·14	66	48,216	1·39	86	46,131	1·86	− 0·47
Total..	172	103,865	..	55	39,746	..	168	91,267	..	291	169,764	..	10	2,774	..	696	407,416	..	608	379,526	..	..
Average for One Year.	19·1	11,541	1·66	6·1	4,416	1·38	18·6	10,141	1·84	32·3	18,863	1·71	1·1	308	3·60	77·3	45,268	1·71	67·6	42,169	1·60	+ 0·11

Stettin.—Statement of the Accounts of the Prussian National Assurance Company (Preussischen National Versicherungs Gesellschaft in Stettin, 31st December, 1851.)

Receipts.

	£.	£.	£.
Marine insurance:—			
Premium reserve from 1850	36,317	1,608	
Do. received in 1851	846,909	11,693	
			13,301
Total assured	883,226		
River insurance—premium on £871,658			2,878
Fire insurance:—			
Premium reserve from 1850	£11,496,319	13,575	
Do. received in 1851 on 21,901 policies	13,425,416	32,946	
			46,521
Total insured	£24,921,735		
Interest account, discount, &c.			5,097
Goods account—Profit on this account			1,857
Total receipts			£69,654

Payments.

		£.	
Marine insurance:—			
Reinsurance premiums		963	
Returns and repayments		296	
Allowances		12	
Losses paid	£11,941		
„ of reserve from 1850	5,914		
		6,027	
Unsettled claims		2,598	
Premium reserve for 1852		686	
			10,582
River insurance:—			
Reinsurance premiums		25	
Abatements		243	
Agents' allowances		302	
Losses paid	857		
Do. of reserve from 1850	17		
		840	
Unsettled claims		36	
			1,446
Fire insurance:—			
Reinsurance premiums		3,500	
Agents' allowances		4,230	
Losses paid	9,115		
Do. of reserve from 1850	1,854		
		7,261	
Unsettled claims valued at		2,470	
Premium reserve for 1852 to 1853		17,968	
			35,429
Charges of management:—			
Advertisements		159	
Printing, stationery		650	
Postage and parcels		282	
Travelling expenses		366	
Salaries and remunerations		1,488	
Rewards and allowances to agents, &c.		165	
Establishing new agencies, &c.		236	
Extra remuneration to the officers		86	
Minor disbursements; stamps, &c.		287	
Contributions to Fire Insurance Companies, and assistance to sufferers by fire		328	
Contribution to central office of River Insurance Companies		44	
			4,091
Other charges			58
Total payments			£51,606

			£
Receipts			69,654
Payments, charges of management, &c.			51,606
Leaving net surplus			£18,048
Deduct interest to shareholders, 4 per cent. on £75,000			3,000
Remaining			£15,048
Of which, to five directors (£43 each)		£215	
Proportion to the managers	£15,048		
Deduct interest on reserve fund of £11,260, at 4 per cent.	450		
	£14,598		
At 2 per cent. each (for two)		583	
			798
Remain			14,250
Whereof by the statutes one-half to the shareholders, at £1. 3*s*. 6*d*. per share			7,125
Remain for reserve fund			7,125
Which, added to the existing fund of			11,260
			£18,385

Results of the business for 1851.

Interest	4 per cent.
Dividends	9½ per cent.
Reserve	9½ per cent.
Total	23 per cent.

CORRESPONDENCE.

"PROPERTY AND INCOME" TAX.

To the Editors of the Assurance Magazine.

GENTLEMEN,—Much has been written, although perhaps but little to the purpose, respecting the evidence given last session before the Select Committee of the House of Commons on the "Property and Income Tax" Act. As it would appear that a misconception has arisen in the minds of some writers with regard to the mode in which a Property Tax, if established on a sound basis, should be levied upon the life-tenants of entailed estates, I may perhaps be allowed to throw out the following suggestions, in the hope that they may be found to simplify the question.

There is evidently a material difference in value between a permanent income derived from existing, tangible, *realized* property, and the precarious income of a professional man or merchant. This palpable difference would modify the tax in this way.

Wherever realized property exists, the *Property Tax* may be levied by the State on the property itself, irrespective of proprietors, life-tenants, reversioners, or other dividend interests.

For the professional classes, on the other hand, it will be a tax on indi-

viduals in proportion to the capitalized value of their temporary incomes, subject to all necessary deductions.

In the case of the life-tenant of an entailed estate, or of the life-renter of money in the funds—the property being in both cases realized—the Government would, as a matter of course, take the full amount of the tax due by that property from the person in possession, leaving the several parties interested to adjust amongst themselves their several shares of contribution, as is now done for poor-rates and other taxes, there being no good reason why the Government should be called upon to interfere in any way in the various subdivisions of the full amount of tax which must be paid by the realized property itself.

The whole question of direct taxation, in its most simple and equitable form, may be looked upon as one of insurance. In exchange for the protection of life, property, and civil rights, the people agree, as it were, to pay the State a small annual premium to insure those benefits, exactly in the same manner as is now done for an ordinary insurance of property against fire. The Fire Insurance Office asks no questions of the intended insurer as to whether he is or is not the owner in fee, or life-tenant, or lessee for a term of years, of the house and property which he wishes to insure; neither would it be necessary for the Government (or State Insurance Office) to ask any of those gratuitous questions.

If the power of entailing estates and settling money be a privilege, which the owners will certainly not deny, they must be content to pay for the privilege as for any other luxury.

Whether an estate be in the hands of the freeholder, or in the occupation of a person whose successors have been selected beforehand, the "risk," or cost of protecting that property, is the same to the "State Insurance Office," and therefore it charges upon both the same annual insurance premium or "annual property tax."

I am, Gentlemen,

Your obedient Servant,

J. HILL WILLIAMS.

12, *Waterloo Place, London,*
22nd October, 1852.

UNIFORM ACTION OF THE HUMAN WILL.

To the Editors of the Assurance Magazine.

[*Extract of a Letter from* HERR LAZARUS, *of Hamburgh, dated 7th December*, 1852.]

In a book recently published about Statistics from Austria (*Handbuch des Statistik des Oestereichischen Kaiserstaats*), by Joseph Hain, I found a collection of facts about the laws governing the human will; and as I think they will be of interest to you, I enclose a translation of some parts.

"Marriage is one of those social phenomena, in which the influence of the human will is of the highest consequence; marriages are most cautiously contracted: and nevertheless, even here a certain law is acting. This is proved by the results collected in Bohemia (exclusive of the army) during the period of 18 years from 1830 to 1847, as shown in the following table:—

Year.	Average Number of Marriages.	Year.	Population.
1830–32	30,007	1831	3,875,657
1833–35	32,054	1834	3,931,831
1836–38	32,200	1837	4,001,925
1839–41	33,181	1840	4,112,085
1842–44	35,243	1843	4,249,669
1845–47	35,254	1846	4,347,962
1830–47	32,990	Average, 1830–46	4,086,521

"From these observations it follows, that out of 100,000 individuals there were

In the year	1830	to	1832	on an average	774	marriages,
"	1833	"	1835	" "	815	"
"	1836	"	1838	" "	805	"
"	1839	"	1841	" "	807	"
"	1842	"	1844	" "	829	"
"	1845	"	1847	" "	811	"
"	1830	"	1847	" "	807	"

making an average of 8 marriages for 1,000 individuals. This law acts even with respect to minute particulars, for the proportional numbers of marriages between bachelors and spinsters, or widowers and widows, or bachelors and widows, or widowers and spinsters, vary within very narrow limits.

Marriages contracted.				Making an Average on 1,000 Individuals—		
Average for the Year.	Between Bachelors and Spinsters.	Between Widowers and Widows.	Between Bachelors & Widows, Widowers & Spinsters.	Between Bachelors and Spinsters.	Between Widowers and Widows.	Between Bachelors & Widows, Widowers & Spinsters.
1830–32	23,148	1,294	5,565	771	43	186
1833–35	24,106	1,477	6,471	752	46	202
1836–38	24,655	1,353	6,192	766	42	192
1839–41	26,188	1,212	5,789	789	37	174
1842–44	28,178	1,244	5,821	799	36	165
1845–47	28,379	1,204	5,671	805	34	161
1830–47	25,774	1,297	5,919	781	39	180

"The law is still perceptible when we class the married under the different ages. There were, according to the ages of the male—

Year.	24 Years and under.	24–30.	30–40.	40–50.	50–60.	60 and upwards.
1830–32	7,137	10,996	7,695	2,572	1,131	476
1833–35	8,430	10,865	7,974	2,938	1,318	529
1836–38	8,292	11,298	7,915	2,999	1,265	431
1839–41	9,132	12,152	7,356	2,882	1,217	442
1842–44	8,812	12,663	9,089	3,058	1,176	445
1845–47	7,588	12,500	10,349	3,204	1,187	426
1830–47	8,232	11,746	8,396	2,942	1,216	458

according to the ages of the female—

Year.	20 Years and under.	20–24.	24–30.	30–40.	40–50.	50 and upwards.
1830–32	5,591	8,804	8,905	5,037	1,429	241
1833–35	5,681	9,828	9,281	5,245	1,708	311
1836–38	5,420	9,698	9,779	5,230	1,742	331
1839–41	5,717	10,386	10,120	4,967	1,636	355
1842–44	5,511	11,104	10,710	5,782	1,739	397
1845–47	5,013	10,341	11,343	6,351	1,774	432
1830–47	5,489	10,027	10,023	5,435	1,671	345

"From this it follows, that in 1,000 marriages the proportion of males, according to the ages, was

Year.	24 Years and under.	24–30.	30–40.	40–50.	50–60.	60 and upwards.
1830–32	238	366	256	86	38	16
1833–35	263	339	249	92	41	16
1836–38	258	351	246	93	39	13
1839–41	275	366	222	87	37	13
1842–44	250	359	258	87	33	13
1845–47	215	355	293	91	34	12
1830–47	250	356	254	89	37	14

In 1,000 marriages the proportion of females, according to the ages, was

Year.	20 Years and under.	20–40.	24–30.	30–40.	40–50.	50 and upwards.
1830–32	186	294	297	167	48	8
1833–35	177	307	289	164	53	10
1836–38	169	300	304	162	54	11
1839–41	172	313	305	150	49	11
1842–44	157	315	304	164	49	11
1845–47	142	294	322	180	50	12
1830–47	166	304	304	165	51	10

"The phenomena represented by these numbers are therefore subject to a certain law, and we will prove this with another class of phenomena. We will examine the statistical reports of crimes committed by individuals under the military jurisdiction during the period from 1826 to 1840. They are divided into crimes as so defined by civil or military law; and the legislation being the same for all parts of the Austrian empire, they give the means of judging the moral position of the soldier with respect to society in general. We need not add, that the free will of any individual is allowed to choose either the path of virtue or of crime.

Years.	Number of Persons.	Civil Crimes.	Military Crimes.
1826–30	2,137,768	35,919	25,620
1831–35	2,472,830	38,888	31,615
1836–40	2,382,480	37.506	27,427
1826–40	6,993,016	112,313	84,692

making an average on 10,000 persons,

Year.	Civil Crimes.	Military Crimes.
1826–30	168	120
1831–35	157	128
1836–40	157	115
1826–40	161	121

"The law is still to be distinguished if we divide these two chief categories into those classes of particular crimes which occur most frequently. Among 1,000 civil crimes there were

Year.	Theft.	Fraud.	Murder and Manslaughter.	Public Violence.
1826–30	418	78	46	35
1831–36	425	77	46	36
1836–40	429	78	49	46
1826–40	424	78	47	39

Among 1,000 military crimes,

Year.	Fraud.	Theft in the Army.	Negligence in Duty of Watch.	Insubordination.
1826–30	569	162	89	74
1831–35	528	193	89	75
1836–40	419	233	111	.96
1826–40	505	197	96	82

REPORTS OF ASSURANCE COMPANIES.

Clerical, Medical, and General Life Assurance Society.—Twenty-seventh Annual General Meeting, held March, 1851.—In the report, the directors remind the proprietors that the bill which was introduced into Parliament last session, and which obtained the unanimous sanction of two Extraordinary General Meetings, received the royal assent in May, 1850, without the mutilation of a single clause, or the curtailment of a single privilege. This Act of Parliament will not affect the division of profits which is to take place in January, 1852, but it will come into operation immediately after the books shall have been closed for the necessary calculations on the 30th June next.

New tables, based on the most approved data, are now in preparation, which will be found exceedingly moderate, with rates for assurance either with or without participation in profits. All policies effected after 30th June next, on the participating scale, will share in the bonus to be declared in January, 1857, in proportion to the number and amount of the premiums paid prior to June 30, 1856. All the profits made during each quinquennial period will be divided in the following proportions—one-sixth to the proprietors, and five-sixths to the assured. The Society, in addition to its accumulated business fund and proprietary capital, has now a permanent reserved fund formed out of profits realized at the last division in 1847, the principal sum of which has been secured by the provisions of the Act of Parliament, while the interest accruing annually therefrom will go to augment the profits at each periodical division.

In the year ending June 30th, 1850, the policies exceed, in number, amount, and new premiums, those issued during the preceding year. The total consolidated fund (exclusive of paid-up share capital), augmented by an addition of £43,616 during the past year, has now reached the sum of £790,273.

At the special general meeting which followed, the following alterations were proposed:—(1.) 30 days, instead of 21 days, as at present, to be allowed for payment of premiums. (2.) The credit system to be adopted; portions of premiums allowed to remain unpaid at interest. (3.) Claims to be paid within 30 days after proof of death. (4.) Wider circuit of foreign countries to which the assured may go without increase of premiums. (5.) Assurances may be granted up to £10,000. (6.) Investments to be extended to loans to the Colonies, where the British Government is guarantee, and to borough and county rates.

Clerical, Medical, and General Life Assurance Society.—A meeting was held, April, 1851, to confirm several resolutions with respect to an alteration in some parts of the deed, which had been proposed at the annual meeting. It was proposed that power should be given to the directors to take assurances up to £10,000, the present sum being limited to £5,000. The last alteration was to enable the directors to lend money to the Colonies on Government guarantees, and to advance sums on mortgage of the rates of any county or borough. The alterations were unanimously confirmed.

Clerical, Medical, and General Life Assurance Society.—Extra-

ordinary General Meeting of the Proprietors and the Assured, held January, 1852, *for the purpose of declaring a Bonus out of the profits which have accrued from the general business of the Society during the five years ending June* 30*th*, 1851.—The report stated that on that day the Society had been in existence twenty-seven years. The income of the Society for the year ending June 30, 1846, was £116,300; that for the year ending June 30th, 1851, £136,100, being an increase since the last quinquennial division of £19,800 per annum.

In January, 1847, the surplus divided was £154,500; on 30th June last, exclusive of the proprietors' paid up capital of £50,000,

	£	s.	d.
The total assets were	864,327	11	1
The total liabilities up to the same date were . .	683,112	4	1
Leaving a surplus of	£181,215	7	0

The above surplus of £181,215 has now to be dealt with; but, in order to avoid inconvenient fractions, the directors have resolved to recommend to this meeting to divide the sum of £180,000.

In conformity with the provisions of the original deed (which alone regulates the present division), one-sixth part of the profits is to be divided among the proprietors, and one-half among the assured for life. This will apportion to the proprietors £30,000, and to the assured for life £90,000, leaving one-third of the said profits, amounting to £60,000, to be laid by as a reserve fund. The proprietors will thus receive a bonus of £6 per share, and the assured a sum of £131,125, being an equivalent in reversion to the above amount of £90,000.

This sum of £131,125 will be added to the policies, and be payable at the death of the respective parties, and will form an addition, varying with the different ages, from 24½ to 55 per cent. on the premiums received during the last five years.

In estimating the amount of liabilities, it is important to observe that each policy has been valued separately; that there has been no encroachment on, or anticipation of, future profits; and that a mode of valuation has been adopted whereby a larger sum than is usual with most other offices has been retained to meet such claims as may arise. This will appear by the following examples:—

Sum set aside as the value of a Policy for £1000.	By Offices valuing by the Northampton 3 per cent. Table.			By the mode adopted by this Office.			Difference in favour of this Office at future divisions.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
Effected at the age of 40, after 10 years.....	152	3	7	158	8	5	6	4	0
Effected at the age of 50, after 10 years.....	197	17	3	215	2	0	17	4	9
Effected at the age of 60, after 10 years.....	282	7	5	326	3	0	43	15	7

The proprietors and the assured are aware that hitherto the profits at each division could only be appropriated in the proportions of one-sixth to the proprietors, and three-sixths to the assured, while the remaining two-sixths were thrown back into the general assets of the Society, and formed an ever accumulating reserve fund.

The consequence has been, that the reserve fund, which at the division at the end of the first

Seven years, in June, 1831, was only		£5,000
Had increased in	1836 to	6,500
"	1841 to	29,500
"	1846 to	51,500
And in June.....	1851 to	60,000

The continual increase of this fund has up to this time operated to the disadvantage of the assured, and has tended materially to diminish the amount of the bonus which would have been apportioned to them had the whole profits been distributed at each quinquennial period. In order to obtain powers to alter the mode of division, and for other purposes, the directors, with the consent of the proprietors, applied for and obtained an Act of Parliament in 1850.

By this Act the reserve fund is now permanently fixed at £50,000, and the profits at the next, and all future divisions, are to be distributed in the proportions of one-sixth to the proprietors and five-sixths among the assured.

The effect of these changes will be to give the proprietors hereafter a much smaller proportion of the profits; but from the additional inducements held out to assurers, the directors venture to hope that a considerable increase of business will afford some compensation for this sacrifice.

"As regards assurers, whether old or new, it is clear that the recent arrangements will prove highly advantageous to them. The difficulties arising from the augmentation of a continually increasing and indivisible surplus have been thus removed; and at the division in 1857 the assured will participate in the proportion above stated, not only in the profits regularly accruing from the general business, but also in the five years' interest derived from the sum of £60,000 now laid by, together with £10,000, being part of the principal.

"It is confidently anticipated that the interest of the said sum of £60,000, together with the £10,000, will alone produce an amount fully equal to that portion of the profits to which the proprietors will be entitled; so that, upon this view, the assured will have the benefit of the entire profits produced by the regular business.

"The Society, therefore, presents all the advantages afforded by proprietary offices, and more than all those offered by mutual offices, since in this estimate no account is taken of the profits which may be realized by policies issued on the non-participating scale—a branch of business which mutual offices do not usually undertake.

"When the provisions of the Act came into operation, on the 1st of July, 1851, the directors caused an entirely new prospectus to be published, embodying every additional facility for assurers which increased experience had rendered it advisable to adopt. Policies can now be effected either on a participating or non-participating scale; the assured have leave to reside in most parts of the world without extra charge; and claims will in future be paid at the end of 30 days after proof of death, instead of three or six months, as is the general rule.

"The directors, therefore, after a period of 27 years of steady and uninterrupted prosperity, are enabled confidently to invite the attention of the public to the great advantages offered to assurers in this Society. An unusually ample sum has been retained to meet future claims. A large

and permanent reserved fund has now reached the limit assigned by Act of Parliament. The expenses of management are small, and do not exceed 3½ per cent. on the income."

In the course of the discussion it appeared that the real sum laid by was £61,215, the fraction over £60,000 not being considered of sufficient importance to divide. The secretary stated, in reply to questions, that one of the results of the Act of Parliament which they had procured was, that during the six months ending 31st December last, the office had issued 48 policies more than during the corresponding period of the previous year, that the funds were valued at the price they cost the Society, and that by the present market value this asset would have been increased by £9,000; that their money was reckoned to accumulate only at 3 per cent., and had they calculated at 4 per cent. instead of 3 per cent., the present profits would have been increased by £50,000. It was explained that the amount of £11,215, with the interest on the entire reserve for the next 5 years, together with the profits for the 5 years, would be divided in 1857, leaving a reserve then of £50,000. A policy is now paid within 30 days after the death of the assured, and assurances were accepted to the extent of £10,000. The number of policies in force on the 30th June last was 4,801. Nothing has ever been lost by bad securities. The amount of mortality amongst the assured last year was not very light. The number of deaths was 114; the estimated mortality expected would have been 128. In the 5 years to June last the result was more favourable, for whilst the aggregate mortality expected during that period was 604, the actual number of lives lost was only 482.

Clerical, Medical, and General Life Assurance Society.—January, 1852.—A special general meeting of this Society was held by adjournment on Thursday, January 29, at the offices, Great Russell Street, to decide upon the confirmation of the report of the directors, from which it appeared that the five years' surplus of profits was £181,000, which the directors proposed to divide. The total assets, exclusive of the proprietors' capital of £50,000, were £864,327; the total liabilities were £683,112. By the deed, one-sixth of the profits went among the proprietors, and one-half among the assured for life—*i. e.*, £30,000 to proprietors, £90,000 to assured, and £30,000 reserved fund, the largest addition during the 27 years' existence of the Company. By the Act of 1850, the reserve fund was limited to £50,000, and the future divisions of profits would be one-sixth to proprietors, five-sixths to assured, every five years added to the amount of their policies; it was expected that the whole profits would hereafter be paid to them, and the expenses met from other resources. The management only cost 3½ per cent. of the income, and the powers now existing for taking policies on the non-participating scale would be very remunerative. The reserve fund had increased to £60,000, and the difference would hereafter yield further benefits to the assured. The report pointed out other peculiar advantages of this Society, and the present meeting was to confirm or reject it. The motion having been put from the chair, the meeting unanimously adopted and confirmed the report.

Colonial Life Assurance Company.—Report presented at the Fourth Annual Meeting, held 1st November, 1850.—On 25th May, 1850, the Company had been in existence four years. The new business of the past

year to that date has amounted to £162,492. 8*s.*, by 241 policies, yielding in annual premiums £6,734. 17*s.* 10*d.*; the whole assurances offered being £204,292. 3*s.*, leaving £41,799. 15*s.* declined as ineligible.

At date of balance: assurances in force, £460,504. 7*s.*; annual premiums, £18,976. 9*s.* 5*d.*

The following is quoted from the report of the Actuary:—"The results of the business hitherto have been very remarkable; assurances have been granted by the Company on the lives of persons resident in India and Ceylon, China, West Indies, South America, Cape of Good Hope, Canada, New Brunswick, Nova Scotia, Newfoundland, Australia, New Zealand, other parties assured being resident in Great Britain and different parts of Europe.

112	lives were on the books at the end of the	1st	year,
307	"	"	2nd "
473	"	"	3rd "
635	"	"	4th "

The average premium paid for assurance has been upwards of 4 per cent., while the average age of the lives assured is not greater than obtains in home business. Now the result to which I have made reference as remarkable is, that eight lives only have fallen by death, being less considerably than one-half the mortality which might have been expected on lives in Great Britain;" but he cautions the members from drawing any rapid conclusions from this early experience.

The three years for which it was declared that the Company would make no dividend had expired; but the directors think that the proprietors may wisely defer seeking profit till the first investigation of the Society's affairs in 1854, when the policy-holders participating in profits are also entitled to their first benefit. In the meantime 5 per cent. interest was agreed to be allowed.

Colonial Life Assurance Association.—Fifth Annual General Meeting, held 1st November, 1851.—Since the opening of the books, on the 2nd August, 1846, the number of policies issued has amounted to 1,047, and the sums assured to £739,616. 19*s.* 7*d.* The following are the annual results:—

Date.	New Policies issued.	Sums assured.			New Premiums.		
		£.	s.	d.	£.	s.	d.
2nd Aug., 1846, to 25th May, 1847	112	102,274	11	0	4,866	1	4
1 year, " 1848	215	160,502	12	0	6,466	11	9
" " 1849	205	129,938	15	0	4,635	10	9
" " 1850	241	162,492	8	0	6,734	17	10
" " 1851	274	184,408	13	7	7,281	1	0

	£.	s.	d.
The actual sum received in the course of the business, exclusive of the Company's original capital, amounts to	76,809	13	9
Premiums paid for reassurances	11,480	12	7
	65,329	1	2
Claims by death	7,970	13	3
Remains to be accounted for . . .	£57,358	7	11

Deducting the expenses of management and all other charges, the difference together with the Company's guarantee fund, invested on good security, affords an available capital of upwards of £45,000.

The number of lives on the books, and the casualties in each year, have been as follows:—

Year.	Lives.	Deaths.
First	112	nil
Second	307	2
Third	473	6
Fourth	635	3
Fifth	837	7
	2,364	18

The rate of mortality, making all allowances, has been considerably under 1 per cent.—a result scarcely to be looked for under the most favourable circumstances from British lives only.

The payment of interest for the past year on the guarantee fund will be made at the rate of 5 per cent., free of income-tax.

The secretary is about to proceed to India next month, to extend the business in the East.

Consolidated Investment and Assurance Company.—Fourth Annual General Meeting, held December, 1850.—No facts relating to the progress of the Company are contained in the report; but the chairman in his address stated that no call had been made on the shareholders for some two years—that £2,841. 15*s.* 11*d.* had been received for assurances—that, comparing the past year with the present, postages had been reduced from £23 to £15, and directors' fees from £332. 10*s.* to £235, and that the office salaries had been reduced very considerably.

County Hail Storm Insurance Company.—From the Third Annual Report it appears that up to December, 1850, there had been a clear profit on the transactions of the past year of more than 38 per cent. on the paid-up capital. Upwards of 115,000 acres of standing corn have been assured during the past year, the premiums on which amount to £2,860. 5*s.* 10*d.*, exclusive of £170. 17*s.* 9*d.* received for insurances on glass and seeds. Compensation for losses, amounting to £1,006. 12*s.*, has been paid to 30 farmers during the past year. The receipts have amounted to £3,130. 11*s.* 6*d.*, and the expenditure £2,312. 16*s.* 8*d.*, leaving a balance of £817. 14*s.* 10*d.* The liabilities of the Company were stated to be £4,127. 7*s.* 2*d.*, and the assets amount to the same.

Defender Fire and Life Insurance Company (1846).—*Fourth Annual Meeting of the Shareholders, held 6th January,* 1851.—The report stated that 1,202 policies had been issued during the year, making a total of 4,310, covering an amount assured of upwards of £4,000,000, for which premiums have been received amounting to £5,225. 19*s.* 3*d.* The claims paid for losses by fire have been 34, amounting to £1,606. 15*s.* 7*d.*

In the life business, 180 proposals have been received, of which 58 have been declined; 122 new policies have been issued, at an annual premium of £866. 17*s.*; and the Company's income under this head is £2,341. 4*s.* 4*d.* Policies connected with loans have lapsed, after an amount of £663. 10*s.* has been paid thereon. During the year, one life has dropped, assured for £198, being the only loss in the life department for two years. No loss has yet been sustained in the loan business.

The directors are enabled to state, that no further calls will be required beyond the one remaining to be made according to the original agreement, viz., 10*s.* per share.

It is shown in the balance-sheet that a balance has been realized in favour of the Company of £9,000. 15*s.* at the end of the first four years, after payment of all the ordinary expenses of the establishment and of conducting the business, including all losses which have accrued during the same period, and an increase upon the surplus fund of £5,570. 4*s.* 7*d.* has been made in the year.

Cash Account for 1850.

Received.	£.	s.	d.
Balance in hand (1849)	133	18	11
For shares	5,566	0	0
Fire insurance	10,606	8	1
Ditto stamps		19	0
Life assurance	2,341	4	4
Ditto stamps	113	2	6
Loans	12,664	7	11
Interest on loans	813	2	6
From bankers	33,001	15	5
Allowance by Government for collecting fire duty	246	9	0
Interest received on shares	9	19	11
Discount on stamps		17	6
	*£65,488	9	8

Paid.				£.	s.	d.
To bankers				32,088	6	11
For loans				23,021	0	6
Duty on fire insurance				3,380	9	5
Allowance on policies cancelled				88	13	5
Guarantee by other Offices				27	9	9
Fire policies stamped				62	10	0
Losses by fire				1,606	15	7
Life policies stamped				85	19	6
Loss by life assurance				198	0	0
Commission to agents				100	0	7
Books, stationery, and printing				130	6	7
Advertisements				37	6	7
Rent, rates, and taxes				122	11	5
Ordinary repairs and office furniture	£34	18	1			
Coals	4	16	0			
Gas	8	17	10	48	11	11
Salaries				861	0	0
Auditors				29	8	0
Directors				317	2	0
Medical officer				54	12	0
Surveyor				50	0	0
Travelling expenses				6	8	9
Postage stamps	£57	2	10			
Receipt stamps	9	12	3	66	15	1
Carriage of parcels				2	8	5
Agents' plates, boards, &c.				1	18	0
Society for the Protection of Trade				4	13	6
Fees to Registrar of Joint Stock Companies for Returns				3	3	9
De Reis Annuity				62	16	6
Interest on shares				677	6	5
Law charges				88	12	6
Balance of cash in hand				264	2	7
				*£65,488	9	8

* These totals should be £65,498. 5*s.* 1*d.* and £63,488. 9*s.* 8*d.* respectively.

Defender Fire and Life Insurance Company.—Annual General Meeting, held January, 1852.—From the report it appeared that in the course of the last year there had been issued 1,500 new policies, being 300 more than were issued during the previous year. The amount insured thereby was £1,362,740; the total number of policies issued by the Company, 5,864. In addition to this, the Company had issued 82 guarantees upon sums insured by other Offices, amounting to £81,580. The total amount insured by the Company was upwards of £5,000,000. The duty paid to the Government in the year 1850 was £5,380. 9*s.* 5*d.*; and in the year 1851 it had increased to £6,162. 5*s.* 3*d.* This increase of the business, it will of course be expected, has increased the amount of losses—which the directors regret to report have greatly exceeded those of any former year. The premiums received having increased from £5,225. 19*s.* 3*d.* in 1850 to £7,151. 17*s.* 9*d.* in 1851, has enabled the directors to meet the claims arising from fires, and amounting to £4,411. 14*s.* 3*d.*, besides making an addition to the accumulating fund nearly equal to that which was made in the preceding year. The life department continued to afford the directors but little satisfaction, and efforts were being made with a view to extend this portion of the business. 139 life proposals had been received during the year, and 109 new policies had been issued, insuring £42,140; and, for various reasons, the remainder had not been proceeded with. Two deaths had occurred during the year, occasioning a loss of £150. The total number of lapsed policies was 65, on which premiums had been paid amounting to £1,387. 11*s.* 5*d.* It had not been thought necessary during the past year to call up the remaining sum of 10*s.* per share, which it was well understood was to be the final call upon the shares; but, in order to close the capital account, it was the intention of the directors to do so early in the present year.

Dundee Marine Insurance Company, January, 1851.—At the Annual General Meeting of the Dundee Union Association several important alterations were proposed and adopted in the present rules, the chief of them being the institution of the order of first, second, and third-class vessels, and of differential premiums, according to each class. The election of the committee of management, which used in former years to pass over quietly, excited great interest on this occasion—there was, in fact, a regular poll, parties having been brought to vote from all parts of the town; and the business, usually brief, occupied nearly five hours.

Engineers, Masonic, and Universal Mutual Life Assurance Society (1848)—*Annual Meeting, held March*, 1851.—The directors report that, during the year 1850, 392 proposals for assurance have been submitted to the board, of which 323, assuring the sum of £85,525, and producing annual premiums to the amount of £2,962. 15*s.* 5*d.*, have been completed; 31 proposals, for £14,800 declined, and 38, for the sum of £15,100, stand over for completion or further consideration.

The number of claims from death during the year has been five, and the amount paid upon these, and the claims which arose in December, 1849, is £2,250. There are not at the present time any claims on the Society.

The annual income derivable from premiums alone upon the 1,174 policies completed to the 31st of December, 1850, is £10,076. 11*s.* 4*d.*

Statement of Policies Completed.

	In 1850.	Total to 31st Dec., 1850.
£2000 and upwards	4	9
1000 and under £2000	11	67
500 " 1000	44	152
200 " 500	100	368
100 " 200	146	472
Under 100	18	106
	323	1174

Engineers, Masonic, and Universal Mutual Life Assurance Society.—Annual Meeting, March, 1851.—The directors have to report that, during the year 1851, 289 proposals for assurance have been submitted to the board, of which 229 have been completed, assuring the sum of £72,400, and producing annual premiums to the amount of £2,498. 10*s.* 6*d.*; 41 proposals, for £17,150, have been declared, and 19, for the sum of £9,250, stand over for completion or further consideration.

The amount of claims paid in the year is £150.

The annual income derivable from premiums alone, upon the 1,403 policies completed to the 31st December, 1851, is £12,574. 11*s.* 10*d.*

Statement of Policies Completed.

	In 1850.	Total to 31st Dec., 1851.
£2000 and upwards	3	12
1000 and under £2000	12	79
500 " 1000	34	186
200 " 500	93	461
100 200	69	541
Under 100	18	124
	229	1403

The chairman stated that in 1849 the average amount of the policies completed was £221; in 1850, £269; whilst last year the average amount of each policy completed was £316: that all risks exceeding £2,000 on a single life were reassured; and that, to prove their care in selection of lives, they had rejected one-seventh in number, and one-fifth in amount, of the policies proposed for their acceptance during the past year. The expenses of the home or head office had been reduced from £4,000, which was the amount in 1849, to £3,670 in 1851.

REVIEWS OF NEW WORKS.

We extract the following from the Supplementary Number of the *Philosophical Magazine*, just published, entirely concurring in the views expressed by the writer:—

"*Life Contingency Tables.—Part I. The Chances of Premature Death and the Value of Selection among Assured Lives. By* EDWIN JAMES FARREN, *Fellow of the Institute of Actuaries, and one of the Actuaries authorized to certify Tables for Friendly Societies.*

"THE continual increase which has been for many years past taking place, more particularly in this country, in the amount of property either

assured upon human life or in some way or other depending upon it, has rendered the accurate determination of its average duration a matter of the utmost importance; and accordingly, many most laborious researches have from time to time been entered upon, with a view to ascertain not only the true rate of mortality prevailing amongst the general population, but also that found to obtain in particular localities, or under circumstances not of an ordinary character.

"In the very able work before us, Mr. Farren has proposed to himself the resolution of a problem looked at with much interest by persons familiar with this subject: availing himself of certain data collected by competent persons, with great care and precision, from the records of several of the principal Assurance Companies, he has endeavoured to show the effect of selection amongst assured lives—that is, to what extent the rate of mortality is diminished during a given year amongst persons of all ages pronounced to be eligible for assurance at the commencement of that year. A table formed from such observations might, as Mr. Farren says, 'be expected to display the extreme value of selection, and thus afford a minimum rate of mortality'; for it must be remembered, that in the ordinary tables, the numbers exposed to the chance of death at every age are made up of persons selected at that and almost all previous ages. Compared with such tables, and with one exhibiting the rate of mortality prevailing amongst the male population of England and Wales, the results obtained by Mr. Farren are very curious. We give the following brief abstract to enable the reader to judge of them:—

Ages.	Mr. Farren's results.	General Mortality amongst Assured Lives.	Mortality amongst the Male Population.
	Mortality per 1000.	Mortality per 1000.	Mortality per 1000.
21 to 30	6·2214	8·1342	9·1347
31 „ 40	7·4866	9·7320	11·7947
41 „ 50	11·4201	13·3971	15·2106
51 „ 60	21·3524	23·4302	22·9492
61 „ 70	41·4718	46·7017	48·8562

"It will here be seen, that selection operates at all ages with considerable force in diminution of the ordinary mortality, and that, as might be expected, the force has a tendency to increase as the age increases. It is probable that the general effect would be still greater, but that it is counteracted by the efforts continually made to effect assurances on not very good lives; 'the more precarious the life, the greater the inducement,' as Mr. Milne observes, 'for persons interested in its continuance to get it insured.' One remarkable feature in the tables is the comparatively low rate of mortality amongst the general population in the last decade but one, that obtaining amongst assured lives being actually higher. Mr. Farren accounts for this, partly by a peculiarity in the construction of Mr. Farr's table (the mortality amongst the male population), and partly by the supposition 'that persons seeking life assurance at the ages in question form a better criterion of their own health than at other periods of life, and thus render the task of selection by parties having an opposite interest more than usually difficult.' It will probably be conceded, that about the period

of life referred to intimations of latent diseases are of more general occurrence than at any earlier one, and that in later life their development makes them apparent; but these considerations scarcely seem to suffice for explanation of the anomaly.

"We have not space to follow Mr. Farren through many other ingenious deductions, but we must not pass by without comment the learning and ability displayed by him in the adoption of methods for the construction of his tables. After exhibiting various modifications of the function a^{b^c}, first applied by Mr. Gompertz to these investigations, Mr. Farren makes use of the calculus of finite differences for the purposes of interpolation till the age of 71. After that age, because 'the admissions are too few to admit of the supposition that the same mixed generic law will continue to prevail,' he has recourse to the formula $\lambda^x l = \lambda' l \frac{r^x - 1}{r - 1}$, by means of which, and the theory of equations of n dimensions, the remainder of the table is interpolated.

"Lastly, the means are afforded of tracing, from the original data, the several values made use of; so that the whole series of operations may be followed, and the connection between the first and last values easily confirmed. As Mr. Farren wisely observes, 'all modern publications on these subjects must principally depend, for even ordinary acceptance, upon the attention paid to such details'; nothing, he may be assured, was better calculated to secure for his labours the confidence they so evidently deserve. He is quite right, we think, when he says that tables of mortality solely depending for their adoption on the authority of the authors framing them, will eventually be discarded."

The Prudent Man's Almanack, for 1852; *with Essays and Illustrations of every branch of Assurance—Life, Fire, Marine, Freehold, Accident, Guarantee. With Practical Suggestions for the Extension of the Principle of Average to sundry National and Social Purposes.* By WILLIAM BRIDGES, Actuary and Secretary to the Mitre General Life Assurance Association; Author of 'Freehold Assurance.' London: D. M. Aird.

THIS little work, written in a simple and fluent style, contains in a short compass many practical remarks on the nature and benefits of assurance, and useful suggestions for its extension. One of the most novel of these is, "that as an alternative of emigration, and other social movements to obviate the compulsory celibacy of an immense proportion of the female population, an association might be established to promote what might be called Marriage Insurance. The object and *modus operandi* would be in consideration of a small yearly premium to guarantee a sum of money to any female remaining unmarried at a given age. It might be expedient, however, to include in the calculation the guarantee of a smaller sum as a dowry in the event of marriage before the age agreed on." How accurate premiums are to be calculated for an event which depends so much on the boon offered remains to be proved; but the application of assurance to many new subjects of social and commercial relations, some of which are recorded in this little work, is becoming every day so much extended that there is no reason to suppose even such a question may not be brought within safe calculation. Cattle insurance, accidental insurance for providing

compensation for loss of life or limb by railway or other accidents, assurance of defective and unmarketable titles of property, of fidelity, against commercial failures, against damage to goods by railway, river, or other modes of conveyance, and, in fact, the equalization of losses in all kinds of property where the averages can be ascertained, are surely worthy of every encouragement in a commercial country like this, and a great benefit in addition to life, fire, and marine assurance, which up to a recent period were all we could boast of. This little book contains many valuable suggestions, and furnishes more matter for reflection on all these subjects than from its simple and unpretending character the reader would expect.

Report on the Mortality of Cholera in England in 1848–49.

THIS very remarkable work is the result of the labours of Mr. Farr, to whom the preparation of the report was confided by the Registrar-General. The Registrar-General was requested, in 1850, by the General Board of Health, to make out a "return of all cases of cholera that occurred in England and Wales, distinguishing sex and age." After well considering the subject, he thought it desirable, not only for the use of the General Board of Health, but for circulation throughout the country, that a complete history of the late epidemic should be drawn up from the facts recorded in the register-books of deaths, distinguishing not only sex and age, but also the professsion, the date of death, the place of death, and the duration of illness of all persons who died of cholera or diarrhœa in the years 1848 and 1849; giving not only the bare facts, but exhibiting in tables the various combinations of age, profession, locality, &c. We need hardly say that such a task, entrusted to the well-known abilities and earnestness of purpose of Mr. Farr, has resulted in the most complete report that could be compiled on the subject. It is far too important to be hastily dismissed, and we reserve the further consideration of it to a future Number.

Works recently published :—

Life Assurance: its Schemes, its Difficulties, and its Abuses. London: Pateman, 1852.

Letter to the Right Hon. J. W. Henley, M.P., President of the Board of Trade, regarding Life Assurance Institutions, &c. By Robert Christie, Esq. Edinburgh: Thomas Constable & Co. London: Hamilton, Adams, & Co.

On the present Position of the Life Assurance Interests of Great Britain: A Letter to the Right Hon. J. W. Henley, M.P., President of the Board of Trade. By William Thomas Thomson, F.R.S.E., &c. &c. Wm. Blackwood & Sons, Edinburgh and London.

De l'Organisation des Sociétés de Prévoyance, et des bases scientifiques sur lesquelles elles doivent être établies. Par M. G. Hubbard. 8vo. Paris: Guillaumin, 1852.

Our Navigation and Mercantile Marine Laws, considered with a view to their general Revision and Consolidation; also an Inquiry into the principal Maritime Institutions. By W. S. Lindsay. London: Longman, Brown, Green, & Longmans, 1852.

THE

ASSURANCE MAGAZINE,

AND JOURNAL OF

THE INSTITUTE OF ACTUARIES.

On the Objectionable Character of certain Methods very generally adopted for the Determination and Division of Surplus in Life Assurance Companies. By CHARLES JELLICOE, *one of the Vice-Presidents of the Institute of Actuaries.*

[Read before the Institute 27th December, 1852, and ordered to be printed.]

IN a short paper read before the Institute at the early part of this year, after alluding to the erroneous methods commonly adopted for the determination and division of surplus in Life Assurance Companies, I intimated my intention to investigate the nature and character of those methods, and to endeavour to demonstrate the mischievous and injurious consequences resulting from them. In the present paper I propose to commence this undertaking, trusting that the undeniable importance of the subject will be considered a sufficient apology for my somewhat frequent introduction of it at these meetings.

The manner of determining surplus almost universally practised formerly is still, I regret to say, very general. That it should be persevered in as it is, after the somewhat serious consequences which it has been shown to entail have been pointed out, is rather surprising, and would lead to the inference that the *exposé* of its peculiar tendencies has not been understood. As I have on a former occasion explained, the great error which characterises the old method is the using for calculations a table constructed as the Northampton Table is; that is to say, in such a manner as that the premiums charged are directly deducible from the elements of it.

That this is an error has been, I think, sufficiently demonstrated in a paper read before the Institute a year or two back. On the present occasion, I shall content myself with simply showing the results arising from such a practice. For this purpose, let us suppose a Society charging the Northampton premiums, and making its calculations by that table, to have been in existence 40 years, and to consist of 4,000 members, each assured for £1,000 at the age of 30; but the whole body divided into four classes of 1,000 each, the duration of whose assurances is 10, 20, 30, and 40 years respectively. We will further suppose that the real rate of interest prevailing is 3 per cent., and the real mortality that called the "experience." Then, proceeding in the usual way, the liability under each of the four classes will come out as follows:—

	By Northampton Table.	By true Table.
	£	£
Value of £1,000,000, assured 10 years ..	141·978	145·947
" " " 20 " ..	276·590	305·089
" " " 30 " ..	425·051	480·059
" " " 40 " ..	594·938	648·611
	1·438·557	1·579·706

It will hence be seen that the "good old Northampton Table," as some have called it, is rather a dangerous one to trust to. In each of the foregoing cases it not only gives a false value, but, what is a much more serious consideration, an inadequate one;* the total liability, in the instance here supposed, being underestimated by no less a sum than £141·149. A similar result may be looked for whenever the rates of interest are the same, and the true mortality less than that of the factitious table. But, under any circumstances, the liability found by means of such a table can never be depended upon as the true measure of it; and hence it follows, that in Societies still using the Northampton and similarly constructed tables for this purpose, it is certain that the amount of the reserve made by them is not the right one, and that the sufficiency of it, generally speaking, is very questionable.

With the distinction between the true and false values of

* In the paper above alluded to it is shown that $A = \frac{1 + 'A}{1 + \phi(1 + 'A)} - 1$, where A is the factitious value of an annuity, such as that of the Northampton Table, and 'A the true value; and it is from this property that the discrepancies now adverted to take their origin. By "true value" and "true premium" I would beg to be understood, once for all, as meaning such value and such premium as result from a combination of rates of mortality and interest as nearly as practicable assimilating to the actually prevailing rates.

annuities, came in necessarily that between the true premium, or annual payment to provide for the sum assured merely, and such an one as included in addition the provision for extra contingencies. The doubts and difficulties which have hence arisen are quite extraordinary; and the confusion of ideas upon the subject which appears to prevail, more especially out of the Institute, serves at least to show the advantages to be derived from professional association, and the evils which such association is calculated to remove.

Under the old system, premiums known to be more than sufficient for the risk were valued as annuities of less than the true number of years' purchase; under the new system, they are valued at the true number of years' purchase—that is to say, credit is taken for their value as nearly as it can be assigned, and, it being well understood that such value comprehends not only the provision for the risk but for future surplus and expenses, it is equally well understood that the whole of it must be reserved, or that the provision in question will be intrenched upon. For the sake of greater precision, the component parts of this value may also be exhibited, and the due proportion assigned to each. To make the matter perfectly clear, I will give an instance of the result of each method, adopting in each case the supposition as to the amount of assurances in force I have heretofore made. According to the old system, the following will be the result:—

Liability.	£	*Assets.*	£
Value of sums assured	2,607,907	Value of premiums	1,169,352
		Difference, being the further sum required to provide for the risk and for other future contingencies	1,438,555
	£2,607,907		£2,607,907

The new method gives the following:—

Liabilities.	£	*Assets.*	£
Value of sums assured	2,490,810	Value of premiums.....	1,276,687
Value of marginal guaranty, or "guaranty fund"	365,583	Difference, being the further sum required to provide for the risk and for other future contingencies	1,579,706
	£2,856,393		£2,856,393

It will thus be seen, that by the much vaunted use of the Northampton Table every item is wrongly given; the value of the sums assured is too great, of the premiums too little—and, what is worse,

the difference between the two comes out also too little. By the true method, each quantity is correctly represented, the value of the premiums, as before, including that portion of them required to provide for future extra contingencies, but the present value of this item appearing on the other side as the guaranty fund, viz., £365·583.*

Now it is the proportion of this "guaranty fund" to the "value of the premiums" which comprehends the all-important question of the real condition of any given Society. In the instance cited, it will be observed that the reserved fund is 28·6 per cent. of the value of the gross premiums; in other words, that of the £106,688 per annum, here supposed to be receivable by the Society, £30,488, or 28·6 per cent., worth in present value £365,583, is put aside as a reserve to meet the extra contingencies of future years. With the slender information which the other mode affords, it is not possible even to detect the fact that the "difference" is actually too little, much less to arrive at any idea of what amount is put aside over and above the provision for the mere amount of the risks.

Amongst other fallacies advanced on this subject, it has been urged that the valuing the gross premium is improper, inasmuch as it is an "anticipation of profits," and gives an exaggerated importance to the assets thus ascertained; now it is not only perfectly reasonable to proceed in this manner, but essentially necessary to do so. If we cannot assume that one portion of the premiums will be received, it is quite evident that we have no right to reckon upon any other portion; and hence upon this hypothesis the future premiums have no value at all. But the objection cannot be sustained! It is right to value them in this manner, and, as I have said, essential to do so: for if not, a Society charging very low premiums would show, *cæteris paribus*, the same assets as another charging very high ones, supposing both to value by the same table; that is, the "guaranty fund" would be omitted on both sides the account in both—the one Society nevertheless really possessing a much larger guaranty than the other.

But it is the omission itself which constitutes the principal evil;

* I have adopted the term "guaranty fund" for want of a better. It is, of course, the value of the difference between the premiums charged and those required to provide the sums assured, and its proportion to the value of the gross premiums represents the "*bonus giving power*" of a Society. This power is, probably, as high as it ever need be when the ratio is as one to three—that is, when the fund in question is one-third of the value of the gross premiums. The less this proportion, the less, of course, the "bonus giving power." The severity of this test may not be understood very well by the public just at present, but there can be no doubt that it soon will be.

for whilst a certain degree of credit may be taken for such omission, it is scarcely possible to discover whether the quantity omitted is of importance or not. It is clearly necessary that its value be given, that it may be appreciated. Supposing, then, the rates at which the calculations are made to be known, and the calculations themselves correct, this per centage of the guaranty fund will at once disclose the real condition of any Life Assurance Society. It is a kind of *constant*, by which the relative position of such bodies may at any given epoch be fairly measured; and hence it is to the last degree important that it should be made to appear.*

There are other erroneous methods still practised in the determination of surplus, but they are of a minor character; and I shall, therefore, now proceed to consider such as have reference to a much wider field of operation, viz., the division or distribution of the surplus amongst the members. I have on former occasions touched theoretically upon this subject, and I think it has been sufficiently demonstrated that the true mode of dividing any surplus is in proportion to the amount at the prevailing rate of interest of the payments made by each contributor over and above those required for the risk.† I shall, therefore, in what follows, assume it to be so, and endeavour to show, by contrasting this true mode with other methods very commonly adopted, to what extent they are departures from the truth, and in what degree inequitable.

There is, probably, no system which has at the present day more general sanction than that which distributes the surplus in proportion to the excess which the amount of premiums at compound interest exhibits over the value of the assurance in each case.‡ The author of this system seems to have thought, that as the total surplus, after deduction of the expenses, was the difference between the amount of all the premiums at compound interest and the value of all the assurances, the share of each would be found on the same principle. Had he deducted the amount of the true premium instead of the value of the assurance, he would have been right. He overlooked the fact that, beside the value of the assur-

* The advocates for maintaining the old system, who are so tenacious of introducing into the account the item above referred to, lest such introduction should lead to the appropriation of any part of it, appear to forget that there may be a very little margin as well as a very large one; and that, in their anxious desire to conceal the latter state of affairs, they quite keep out of sight the danger arising from the former.

† That is, the share of each contributor is made equal to $\phi a^n \cdot \frac{s}{f \cdot \phi a^n}$ adopting the same notation as that given on former occasions.

‡ That is, the share of each contributor is made equal to $(pa^n - l) \cdot \frac{s}{f \cdot pa^n - f \cdot l}$.

ance, a considerable portion of the premiums paid must have gone to meet the claims, and that, omitting this element, the surplus would be divided, not in the proportion in which each had contributed to form it, but in one compounded of the contribution to surplus and to the payment of claims. In short, the obvious consideration escaped him, that, had the premiums been barely sufficient for the risk, there could have been no surplus at all; and therefore, that whatever there was irrespective of expenses must have arisen from the premiums being more than sufficient for that object.

Proceeding, then, in the manner inculcated by these two methods, and assuming the same data as before, let us contrast the results as they would appear at a division; the assurances participating in which we may suppose to have commenced at ages 20, 30, 40, and 50 respectively.

The following table shows this contrast as it would exhibit itself at what we may suppose to be—

The First Septennial Division.

Age when assurance effected.	Share of Surplus.	
	By true method.	By false method.
20	55·7	41·6
30	60·1	48·4
40	62·1	60·8
50	54·9	82·0

From the above it will be seen that some of the younger members are deprived of their fair share of profits, by the system under consideration, to the extent of about 25 per cent.; whilst their more fortunate seniors get an excess, in some cases, of not less than 50 per cent. beyond the sum they are properly entitled to. Those alone who commence their assurances in the middle period of life receive their due proportion; at either extreme, the inequitable operation of the system is at its highest point.

Now it is not a little remarkable, that the differences between the amount of premiums at interest (always taken from the origin as is, I believe, the usual practice), and the value of the policy, preserve for many years nearly the very same ratio (the number of years being, of course, the same in each case); and hence the foregoing table will truly represent what takes place at subsequent divisions, since the ratios of the true method are obviously always

the same. Thus, at the third septennial division (that is to say, at the end of twenty-one years), the ratios will be as follows:—

Third Septennial Division.

Age when assurance effected.	Share of Surplus.	
	By true method.	By false method.
20	55·7	41·3
30	60·1	48·1
40	62·1	61·4
50	54·9	82·0

nearly identical, as will be seen, with those exhibited in the first; and thus we arrive at the conclusion that, at each septennial division, the same degree, or very nearly the same degree, of injustice is perpetrated by the erroneous method in question as at the first; that is to say, that the share of surplus, or bonus given to the persons who commence their assurances about the age of 50 and upwards, is more than twice as great as it ought to be, and that the deficiency thus created is made good by mulcting those who enter the Society at the earlier periods of life. These observations, it must be remembered, apply to a Society charging the Northampton premiums, as they are called, and making its calculations by the Northampton Table, and in which the prevailing rate of interest is the same, viz., three per cent., but the mortality similar to that called the "experience"; any change in these data will produce a corresponding one in the ratios above given, but none is likely to occur in practice which will altogether remedy the evils here shown to exist.

The next system which I propose to investigate is that which apportions the surplus amongst the members in the ratios indicated by the amount of their payments at compound interest.* In this, as in the instances previously noticed, the irregularities will take a particular character as variations occur in the data. As it will be useful to have the results in such a case, I will now suppose the real rates of mortality and interest to be the "experience" and three-and-one-half per cent. respectively, other things remaining as before. The ratios resulting from the two methods will then be as follows:—

* That is, the share of each contributor is made equal to $pa^n \cdot \overset{s}{\int} \cdot pa_n$.

First Septennial Division.

Age when assurance effected.	Share of Surplus.	
	By true method.	By false method.
20	54·7	39·6
30	59·7	48·7
40	62·8	61·9
50	56·6	82·6

Here we see that, by the method now under discussion, the older lives get about 46 per cent. more than their due share, and that the youngest in the table loses nearly 28 per cent. of his. It will be observed that the ratios afforded by the true method vary very little from those before given, notwithstanding the change in the rate of interest from three to three-and-one-half per cent. These proportions, like those already adverted to, change very insignificantly as the number of years increases; and hence this method, like the foregoing one, gives the persons assured at the more advanced ages a very great advantage over those commencing their assurances at earlier periods of life. It is, perhaps, hardly necessary to mention, that the reason of the discrepancy in this case is, that the surplus is shared in proportion to the contribution to it, and to the amount of the payments for the risk, instead of in proportion to the former only.*

The third mode which I have to adduce, and with the investigation of which I shall conclude this paper, is one of more rare occurrence than those we have now discussed. It is, nevertheless, still practised by some Societies, and would seem to be based upon the idea that the allotment of surplus should be made in direct proportion to the amount of each person's interest in the funds of the Society. It does, in fact, distribute the surplus in proportion to the value of each policy respectively;† or, in other words, the Society is thus called upon to divide its profits in proportion to its liabilities—an arrangement which must be looked upon not only as

* That is, the share of each contributor is made equal to

$$(p'+\phi)\,a^n \cdot \frac{s}{\int.(p'+\phi)\,a^n} \text{ or } pa^n \cdot \frac{s}{\int.pa^n};$$

and I may here add, that when the premiums charged are made up of the "true ones," increased by a per centage, this method would be correct, otherwise not.

† That is, the share of each contributor is made equal to $l \cdot \frac{s}{\int.l}$.

purely arbitrary, but, to say the least, as having nothing whatever to justify it. The manner in which it operates will be seen by the following statement:—

First Septennial Division.

Age when Assurance effected.	Share of Surplus.	
	By true method.	By false method.
20	55·7	36·8
30	60·1	48·4
40	62·1	63·9
50	54·9	83·7

A comparison of this statement with those which have gone before, will show that the errors lie precisely in the same direction. It differs from them merely inasmuch as it exhibits those errors in a still more exaggerated shape. As in the former instances, the ratios do not vary very materially with the lapse of time. The following statement shows their relation at the end of twenty-one years, or, at what we may suppose to be the

Third Septennial Division.

Age when Assurance effected.	Share of Surplus.	
	By true method.	By false method.
20	55·7	37·9
30	60·1	48·9
40	62·1	62·9
50	54·9	83·1

rather, as it will be observed when compared with the foregoing, exhibiting a tendency in the right direction, albeit a very insignificant one.

On reviewing what has been said in reference to these three erroneous modes of division, the members cannot fail to be struck with the singularity of the circumstance, that although they apparently differ so much in principle, they should produce results so nearly similar. A little reflection, however, will show that they do not really differ so much in principle as at first they may seem to do. It is to be remembered, that the value of a policy always bears a certain relation to the amount of premiums paid upon it; and hence the differences between these quantities will have a tendency

to preserve a similar relation.* Whether, therefore, a division be made in proportion to the amount of premiums paid, to the value of the policy, or to the difference between the two, the results will not be very widely different, although of course in each case at variance with the true and proper ones.

Before concluding, it may be worth while to observe the effect of these erroneous methods on the supposition of a given amount of additions having been made or become vested up to the present time. Let us suppose such amount to be £4,656,000 (a sum far below the truth, but assumed for the convenience of calculation merely), and let us further imagine it to have been so paid or become vested in respect of assurances effected at the ages before specified; the following table will exhibit what has been done with this sum, as contrasted with the manner in which it should have been appropriated, the several conditions being such as those I have before assumed.

Age when Assurances effected.	Additions paid or allotted.	Additions as they should have been paid or allotted.
	£	£
20	826,000	1,114,000
30	962,000	1,202,000
40	1,228,000	1,242,000
50	1,640,000	1,098,000

Here it will appear, upon our hypothesis, that a sum of about £530,000 is taken out of the pockets of the younger members, and handed over to the older ones, without anything, it may be, to justify such a proceeding. I do not for a moment mean to deny that under certain conditions these anomalies will sometimes altogether vanish, and the reasoning here mooted be inapplicable. I wish merely to draw attention to the subject generally, and to the necessity of carefully watching what the conditions in any particular case may be, and of adopting such methods of procedure as are suited to those conditions, and as are calculated, in the first instance, to determine the amount of surplus accurately, and thereupon to distribute it amongst the contributors in as rational and equitable a manner as possible.

* See Euclid, book v., proposition 19.

An Exposé of the Fallacy, "That it is just to tax Temporary Annuities at the same rate as Perpetual Annuities." By PETER HARDY, F.R.S., *one of the Vice-Presidents of the Institute of Actuaries, and Actuary to the Corporation of the London Assurance.*

[Read before the Institute 28th February, 1853, and ordered by the Council to be printed.]

THE merits and demerits of the present mode of assessing the Property and Income Tax have been so frequently made the subject of popular discussion, and are in themselves questions of such national importance, that I feel no apology to be necessary for again bringing the subject under the notice of the Institute of Actuaries.

A valuable paper on the inequitable operation of this tax was, some time ago, read before the Institute by Mr. Jellicoe; and, more recently, an elaborate and important contribution on the same subject was brought by Mr. Farr under the notice of the Statistical Society of London, which paper has given rise to a lengthened and very interesting discussion. An exceedingly temperate and able pamphlet has also been recently published by Mr. John G. Hubbard, the Deputy Governor of the Bank of England, in which that gentleman has discussed, with very considerable ability, the views of Mr. Warburton, and has, in my opinion, very effectually exposed their absurdity.

Mr. Jellicoe's paper having been written previous to the examination of the scientific witnesses before the Committee of the House of Commons, its author could not be expected to contend with or reply to the very peculiar and startling theories propounded before that Committee by Mr. Warburton and Mr. Babbage. Mr. Farr, it is true, glanced in a casual manner at those and other fallacies; but his paper was intended to be an exposition of the true theory of direct taxation, and not a vehicle for opposing the particular views of individual supporters of the present system of taxation. Without attempting however, on this occasion, to venture on so lofty a flight as that of the three gentlemen who have preceded me, I shall be contented to address myself simply to an investigation, and, as I hope, to a refutation of the two distinct theories propounded by Mr. Warburton and Mr. Babbage, both of which theories tend to support an income and property tax, levied strictly in accordance with the existing impost.

I shall, however, in the present paper confine myself to Mr.

Warburton's theory alone, leaving for a future opportunity the discussion of Mr. Babbage's very peculiar views.

Mr. Warburton has, I believe, earned for himself an elevated name in the political and scientific world, and is, without question, abundantly endowed with qualifications for mathematical and financial research; to find, therefore, such a man advocating opinions so opposed (according to my view of the matter) to the common sense of the question, is a circumstance so remarkable, that I cannot but suspect that there is an important sophism lurking somewhere in the argument, a radical misunderstanding of some elementary definition; in short, it appears to me more than probable that every apparent difference between us may, after all, be traced to the different meanings which we respectively attach to the word "income." It is, therefore, most important to define clearly and distinctly the sense in which I employ this word, and the meaning which I attach to it.

Real income (as regarded by the year) is an annual profit—a return produced by the employment of capital. To constitute *real* income, it is absolutely essential that this return should be produced *by* and not *out of* capital; that is to say, it must be perpetually producible, *without destroying or in any degree impairing* the producing power of the capital itself. If in such annual returns any portions, however small, of the capital be included, and under a mistaken notion of their character, expended, it is obvious that such capital will be by so much lessened, that its producing power will be *pro tanto* diminished, and that, if the process be sufficiently continued, the whole capital will sooner or later be exhausted and disappear. It is, however, by no means a frequent circumstance that the nature of these returns of capital is misunderstood; on the contrary, whatever they may consist of, they are by the individual, as well as by the capitalist, carefully preserved and reinvested in some new form, so that on the exhaustion of the capital from the original investment, a new capital, equal to the former in amount, is created.

Real income, consequently, is not (as defined by some writers) the gross amount which comes into the receipt of any individual in the course of a year, but merely that portion of his receipts which he may safely expend without lessening his actual capital or weakening its productive power.

In all annual receipt of money it is, therefore, highly requisite to discriminate carefully between *real income* and *return of capital.* By way of illustrating this difference between incomes in which no

portion of repaid capital is included, and incomes in which certain portions are periodically returned, I will take the dividends on consolidated stock, the rent of land, interest on loans by way of mortgage, &c., as instances of *real income:* year after year, the stock, the land, the loan continue to produce to their respective owners *real incomes,* without exhausting or diminishing their productive power. But a temporary annuity, an annuity for a life or lives, and a professional income, are in like manner instances of *apparent incomes,* in which a portion of the capital originally invested is periodically repaid.

In the first two of these last examples it can be mathematically demonstrated (as will presently appear) that in each payment a portion of the original capital is in fact included.

In the case of a professional income, although mathematical proof cannot be adduced, yet common sense, and a little reflection, will show that with every beat of the pulse of life a portion of the strength and energy of the individual is wasted, and, consequently, a portion of the capital originally invested in education, or subsequently acquired by skill and industry, is expended, and that the last and closing scene of life witnesses the entire exhaustion of the original capital; and unless the repayments made in past years have been treasured with providence and fostered with care, the professional man will too often leave behind him no portion of that capital which has supported him and his family through life. In addition to the foregoing definitions of real income, I consider it essential to my argument to take up the following position, viz.:—

That an *income tax,* as such, can be levied on *income* only, and must in no case and in no degree affect the capital itself.

Mr. Warburton's theory is shortly this: "If the income tax is to be a temporary impost, it is *unjust* to tax temporary incomes at the same rate as perpetuities; but that if an income tax is to constitute a permanent burden on the means of the country, it is then perfectly equitable to tax a temporary income at the same rate, on the whole amount thereof, as a perpetuity;" and for this reason, "that whereas a *perpetual income* bears a *perpetual tax,* a *temporary income* bears only a *temporary tax.*" Now this I readily admit is a plausible theory to those who are unaccustomed to these and similar investigations, and subtle enough even to those who are. Mr. Hubbard has however most truly stated, in answer to Mr. Warburton's first proposition, that "no scheme of income tax, *unsound and unjust for a year,* will be just when the tax becomes perpetual."

My principal business in this paper being to endeavour to expose the fallacy of Mr. Warburton's entire proposition, I shall claim to be successful if I can show that in the adoption of this theory the tax is levied on any portion of the capital, no matter how small that portion may be. The best instance (because the one most easily investigated) which can be selected of a temporary income, is that particular Government or Parliamentary stock, known by the name of the Long Annuities. I shall confine my argument wholly to this class of temporary incomes, and shall base it on the following illustration:—

I lend a friend £1000, at 5 per cent. per annum interest. It is obvious that I may, in accordance with my previous definition, safely expend £50 annually, so long as the loan is continued, because such interest is *real income;* but it is equally obvious that I can expend no more without trenching on and diminishing my capital.

If my friend agree to repay the loan in the course of a couple of years by two equal instalments, I should receive at the termination of the first year the sum of £550, being, in point of fact, the interest on my £1000 for the year, and a repayment of one-half of the loan as agreed on. At the termination of the second year, I should in like manner receive the sum of £525, being, as before, a year's interest on the £500 left unpaid, together with the repayment of the balance of the loan. I would now venture to inquire, whether I should not exhibit utter ignorance of my true financial position, and display very bad economy, were I to consider my gross annual receipts in those two years, viz., £550 and £525 respectively, as income, and as such expend them? Palpable as such a blunder would appear to be, it is nevertheless the error virtually committed every day under the present system of taxation, and the justice of which is vindicated (as I shall presently proceed to show) by all who adopt Mr. Warburton's theory, and indeed by all who advocate the imposition of a tax on the actual receipts of each year.

It is unimportant what name may be given to this inequitable impost, but I would ask, If a tax were levied on the two gross annual receipts described in the foregoing illustration, whether such tax is not levied on the *gross capital* of the owner as well as on his *real income?* To this question there can be but one answer. Now extend the term of repayment, in the case of a similar loan, to *four years,* and we shall have in the four successive years the following payments, viz.—

	Principal. £.		Interest. £.	s.		£.	s.
At the end of the 1st year.....	250	+	50	0	=	300	0
" " 2nd "	250	+	37	10	=	287	10
" " 3rd "	250	+	25	0	=	275	0
" " 4th "	250	+	12	10	=	262	10

I would again ask, If a tax be assessed on those four gross payments, viz., £300, £287. 10*s.*, £275, and £262. 10*s.* respectively, would not, in such case, the tax have been levied on the gross capital as well as on the real income? Extend the term, if you will, to 50 or even to 100 years, and although you diminish the amount of injustice committed in each particular year, yet the total amount of injustice is the same; and in the end the tax is levied on the gross capital, as well as on the accruing income.

It will be now my business to show that a long annuity is nothing else than a loan contracted by Government, and originally agreed to be repaid by 60 annual instalments,* each dividend containing within itself a portion of the original capital repaid. It is quite true that the payments which include these instalments are constant in amount, viz., £1 in each year, while the payments of the loan in the illustrations already given vary in amount in each year, the sum repaid being constant. It can, however, be readily shown, that there is no substantial difference between the two, and that in each case a tax levied on the apparent income of each year is levied not only on the real income or interest, but on the entire capital as well. In the case of a loan repayable by equal instalments, let V represent the capital put out for n years at i per £1 per annum interest, then $\frac{V}{n}$ will be the amount of capital annually repaid, and the successive payments will be

$$\left(\frac{V}{n}+Vi\right)+\left(\frac{V}{n}+\frac{\overline{n-1}.Vi}{n}\right)+\left(\frac{V}{n}+\frac{\overline{n-2}.Vi}{n}\right)+, \text{ \&c. to } n \text{ terms.}$$

Now one portion of each term, viz., $\frac{V}{n}$, is obviously constant in each term, while the other portions of each term, viz.,

$$\left(\frac{n.Vi}{n}\right),\left(\frac{\overline{n-1}.Vi}{n}\right),\left(\frac{\overline{n-2}.Vi}{n}\right), \text{ \&c.,}$$

* We are all well aware that the long annuity is payable half-yearly, but it is unnecessary to complicate our argument by dealing with it, excepting as an annual payment.

as obviously annually decrease; each payment, being an entire term, must consequently decrease too, and the sum of the n terms will, by a very easy summation, be found equal to

$$V+\frac{\overline{n+1}.Vi}{2}:$$

thus the whole capital (V) originally put out to interest is repaid within the term, together with $\frac{\overline{n+1}Vi}{2}$ total interest, and a tax levied on each full term of this series is obviously levied on V, as well as on $\frac{\overline{n+1}.Vi}{2}$.

Now if these decreasing terms, in which the sum repaid in each year is constant throughout the series, be equated, and the terms themselves made constant, then the instalments of capital repaid in each year, and the interest thereon, will both vary in each term—the one increasing, and the other decreasing, throughout the whole series. Putting V_n, or its equivalent,

$$\frac{\frac{1}{\overline{1+i}^n}}{i},$$

equal to the value of an annuity of a constant £1 per annum for n years, which is also to be equal to the sum invested, and putting $V_{(n-1)}$, or its equivalent,

$$\frac{\frac{1}{\overline{1+i}^{n-1}}}{i},$$

equal to the value of a similar annuity for $\overline{n-1}$. years, and so on, we shall obtain the three following series, viz.—

$$1+1+1+1+1, \text{ \&c. to } n \text{ terms,}$$

for the actual full terms of the series, or total payments made in each year;

$$V_n i+V_{n-1}i+V_{n-2}i+V_{n-3}i+, \text{ \&c. to } n \text{ terms,}$$

for the amounts of interest paid in each successive year; and consequently

$$(1-V_n i)+(1-V_{n-1}i)+(1-V_{n-2}i)+(1-V_{n-3}i)+, \text{ \&c. to } n \text{ terms,}$$

for the amounts of capital repaid in each successive year.

Now the sum of the second series is manifestly equal to

$$i(V_n+V_{n-1}+V_{n-2}+V_{n-3}+, \&c.)=i\left(\frac{1}{i}\left(n-\frac{1-\overline{(1+i)^n}}{i}\right)\right.$$

$$=n-\frac{1-\overline{(1+i)^n}}{i};$$

and consequently the total capital repaid within the entire term will be the sum of the third series, which is manifestly equal to

$$\frac{1-\overline{(1+i)^n}}{i}=V_n= \text{to the sum originally invested:}$$

consequently, a tax which is levied on each £1 throughout the whole series is not only levied on the interest, but is also levied on V_n (the capital) as well.

It is hardly necessary that I should explain that this last series is neither more nor less than a long annuity; and I believe that I may fairly claim to have satisfactorily made out, that in the case of every temporary annuity where the tax is levied on the dividend received in each year, it is in truth levied on the capital as well as on the interest.

Looking at the strictly mathematical character of the foregoing reasoning, it would appear that Mr. Warburton's peculiar view of the justice of taxing each full payment of a temporary annuity must of necessity arise from the circumstance of his having assigned a meaning to the word "income" quite different to that which is the true one. If he regard the periodical receipt of money, whether real or apparent income, as an avowal on the part of the receiver of an intention to expend it, or if all capital repaid by way of periodical instalment were actually annihilated on being so repaid, I could then comprehend the justness of his reasoning and the soundness of his theory, because in such case the temporary tax on the larger temporary dividend would be exactly equivalent to the perpetual tax on the smaller but perpetual dividend; but as such in truth is not the case—as capital so repaid by periodical instalment is not and cannot be treated by the receivers thereof, whether private individuals or public capitalists, as income—and as such capital, so far from being annihilated, reappears in some other form of investment, and constitutes a portion of the general property of the country—so any attempt to argue that it is annually expended is unfair, and every attempt to tax it is unquestionably unjust.

The flimsy argument that capitalists have chosen to invest their money in this particular sort of security, called temporary annuity, because it is more convenient, or perhaps because it offers greater apparent advantages to them than other contemporary investments, and that they ought therefore to be made to pay for such special considerations by a tax on their capital, is so manifestly an absurdity that it scarcely deserves a serious denial. Another argument which has been brought forward is, that the present holders of long annuities have received compensation for the heavier rate of taxation with which they are burdened, in the price which they paid for the original purchase of their stock. This is untrue; and even if it were true, it would in no way justify the original imposition nor the present maintenance of such a tax, because such compensation could only have been obtained at the cost of other individuals equally entitled with the present holders to the protection of the State, inasmuch as they must have made their purchases at a lower comparative rate than that at which the same stock was originally purchased by the seller. If Government, indeed, granted such annuities at the present time, and in doing so sold them to buyers at rates sufficiently low to protect them from loss by the operation of the income tax, in such case doubtless the holders would be compensated, and they would have no real cause for murmur or complaint. But it is not so; and even if it were, it is evident that the loss of the Government would in each case be precisely the same as the gain of their customers.

In a leading article on the subject of the income tax, the *Morning Chronicle* very recently endeavoured to find an absurdity in my argument in behalf of the present holders of long annuity, on the ground that I had asserted, that if any compensation were really made by a reduction in the cost of the annuity, it was the seller and not the present holder that suffered. Surely, however, the *Chronicle* will admit that the holder of to-day may be the seller of to-morrow, and that he is fully entitled to claim protection against a wrong with which he is threatened, as against one which is actually perpetrated.

I think it will be admitted that if I have made out a case of injustice as regards the long annuities, that such reasoning will in like manner maintain the injustice of the operation of the tax on every other description of temporary annuity, whether for very long or for very short periods, whether certain or uncertain, whether for a life or lives.

It would not be more difficult to show that Mr. Warburton's

theory is equally untenable in the case of professional incomes; but this is so large and important a question, and will be so fully investigated in my proposed reply to Mr. Babbage, that I shall not enter on the inquiry on the present occasion.

The question of annuities purchased by individuals on their own lives admits of a more elaborate discussion. It has been argued with some speciousness, that if it could be made apparent that a life annuity when purchased was intended to be wholly expended, Government would be then entitled to deduct the tax from the full annuity, because each payment of such annuity containing as it does a portion of capital which by expenditure is supposed to be destroyed, and the State being admitted to be entitled to a *perpetual tax on the real income of all capital,* no member of the community has the right to withdraw or annihilate as it were his individual portion of the aggregate wealth of the country, merely to increase his own present means of enjoyment, or to afford himself a greater abundance of comforts and luxuries. But this is manifestly a fallacy. No capital can in reality be expended so as to be destroyed—no portion of capital can be withdrawn from the national wealth, unless indeed its proprietor were to throw it to the bottom of the sea, or to dig a hole and bury it in his garden. The capital of the annuitant, if it be expended by him, passes into the possession of others, and is in their hands and under their ownership, producing income and bearing its fair share of the taxation of the country; but besides this, we have no right to presume that any individual who converts a perpetual into a life income acts from any other motives than those which influence the capitalist and the financier, who remove their property from one sort of investment to another. If the justice of taxing an annuity, merely because it is supposed to be actually expended, were to be once admitted, it would not be very difficult to justify the imposition of a tax on all expenditure, whether within or beyond the means of the individual—whether on the expenditure of the provident father who, beyond his income, devotes some portion of his capital to the education of his children, or whether on the idle spendthrift of middle life who incurs beyond his means debts hopeless of their future liquidation, or on the gartered noble who expends on the turf or over the gaming table more than the rental of his patrimonial acres.

I shall now bring this paper to a close. Much has been said and much has been written on the subject. The objectors to the present system of taxation have been most unfairly charged with

having endeavoured by popular clamour to overthrow a just and necessary tax, and with having argued against it from individual and selfish motives. Neither of these accusations is true. The supporters of the tax, on the other hand, have resisted every attempt to inquire into its injustice, and have brought forward in its favour arguments as transparent as they are feeble. This is not the way in which a great national question ought to be met. Men's minds have expanded within the last fifty years in a ratio previously unknown; and the present generation look for something more than empty declamation, or appeals to a former statesman and his measures. They cannot accept as unerring truths the exploded dogmas of Mr. Pitt, merely because they have been hallowed by the lapse of half a century, or because they have received the sanction of preceding and perhaps subservient senates.

On the Reliability of Data, when tested by the conclusions to which they lead. By Edwin James Farren, *one of the Vice-Presidents of the Institute of Actuaries.*

[Read before the Institute 22nd March, 1853, and ordered by the Council to be printed.]

It is a well-known feature in the advancement of learning, that the more knowledge becomes prevalent, the less positive do opinions become. Not only in theology does the staggering demand of "What is truth?" assail us, but we meet with the same impregnable question in all the pursuits of literature and science, obliging us to admit that the truth of yesterday is not always the truth of to-day, and that to-morrow may still be about to offer us some third form.

The older class of writers felt no such difficulty. They conceived they were in possession of certain abstract truths or data that might be considered as fundamental axioms, and that by these axioms might all conclusions whatsoever be tried. If the conclusions were incredible, it was the logic that was to be impeached, not the axioms; for it was taken as the reigning axiom of all, that axioms themselves could not be misconceived or defective. The more general lover of research owes it to mathematicians, that this mechanical form of procedure, that this exaltation of one class of assumptions as tyrants over all others, has become disregarded; for it was by labourers in the exact sciences that it was first fully shown, that starting from

presumed axioms, and proceeding step by step with the precisest precision of logical sequence, that not unfrequently one presumed axiom considered as a premiss could be made to actually deny another presumed axiom considered as a conclusion. The inference was thus gradually established, though not without considerable labour of illustration, that the human mind really possesses neither an innate nor an acquired power of distinguishing axioms, and that not absolute truth, but merely the temporal discussion of the varying definitions of truth, is all that our reasoning powers can strictly pretend to.

The recognition of this somewhat unpalateable doctrine, of the mere probability of truth occupying the place of truth itself, has, nevertheless, opened the way for a more tempered style of demonstration and argument, in which not only premisses or data are allowed to shape out conclusions, but general conclusions are not wholly precluded from having a quasi-suggestive power over assumptions or the reliability of data. We have a well-known illustration of this in algebra, in which it occasionally happens that though starting with what seem to be undeniably positive symbols, yet that we gradually arrive at negative conclusions. The elder school of writers, finding that in many of such cases they could not impeach the logic, were content to evade the difficulties by calling them irreducible; but the modern mathematician at once looks upon them as warnings, not merely that he must re-examine his logic, but more especially the nature of his original postulates.

In life assurance, considered as a branch of applied mathematics, we are also to consider we receive similar warnings, whenever we are led to the pourtrayal of paradoxical conclusions, setting us at variance with our otherwise well ascertained general notions of the character of life and death. An instance is afforded us in the old assumption that the premium for a year's insurance of a healthy man at one age should be neither greater nor less than the premium at another; but by the aid of such a premiss the conclusion could be arrived at, that the mass of healthy men should gradually pass from age to age without showing any of the well-known ravages of time, and that healthy sires should not be distinguishable from their healthy sons. The more such paradoxical conclusions became displayed, the more they re-acted upon the premiss from which they sprung, and finally engendered the now prevailing notion, that the mere circumstance of age, is of itself to be reckoned, if not among the actual diseases of life, yet of so cognate a character as to be capable of creeping on by such insidious degrees as to leave

a man in apparent health all his life, and yet become the ultimate cause of his death.

There must be many members of this Institute who will scarcely believe it possible that there are still writers who do not consider time as an enemy to vitality, but that it acts, not only during early childhood or the period of growth, but even at 40, with a sort of curative power, that is supposed to be only partially afforded to the healthy man of 20, until he shall have doubled both his age and his experience of what our common enemy time can really do. And yet the question of "*Is there a materially greater risk in the assurance of a select life of from* 40 *to* 45 *than of a select life from* 20 *to* 25 *for one year?*" has been recently and somewhat formally put, as apocryphal, to the present writer as the author of some life contingency tables, in which he has virtually considered, that however firmly a man may appear to be in possession of what is called select health, yet that he is still infected with the growth of the disease called time or age, and that when seeking a year's or a day's, nay even a moment's insurance, should be relatively charged in that respect.

Many of those now present may remember a paper, headed with the above question, being read before this Institute about two years and a half ago; and, from its not having been recommended for printing by the Council, generally thought to have been considerately withdrawn by its ingenious and evidently sincere author, Mr. Spens, of Glasgow. The paper, however, has been recently printed and circulated by its author, who, with a fondly cherished zeal in his own opinions, has further announced that he conceives the experience of certain Scottish Offices will be found confirmatory of his "*favourite theory that in the assurance of a select life for one year I would almost be disposed to give a preference to the advanced age from* 40 *to* 45 *over a greatly younger life.*"

It has been already hinted that this is virtually merely a revival of an old notion, and therefore might still be left to constitute the favourite theory of the respected actuary of the Scottish Amicable about half a century after the abandonment of a similar notion by its paternal institution, the Amicable Society of London. But in the present day, when new schemes for life assurance are so eagerly sought for, as to urge the adoption of almost any expedient to attract public attention, Mr. Spens' paper may be inconsiderately made in other hands an authority for also turning aside more material distinctions. Such is the more likely, if the case be allowed to pass wholly unnoticed; because, from the paper having been

originally read and now bearing, at the instance of its author, the inscription of having been read before this Institute, it might seem to be emblematical of the opinions not opposed but current here, and the more especially if not questioned by those who have made the relative insurance of select and diseased life their peculiar study. It has, therefore, been thought useful to bring the subject once more under the consideration of the Institute, that, at least, those fond of discussion may have an opportunity of assenting to or dissenting from Mr. Spens' views, who, in his own earnest desire for truth, is only the more inclined to believe that others are actuated by the same desire, as is shown by the substance of his last paragraph—"That he is sure there is none who will give the subject a more candid consideration than the gentleman to whose work he has alluded."

It will, probably, be considered obvious, from the preceding remarks, that a truly candid consideration of such a subject produces results unfavourable to Mr. Spens' ideas, because sufficient attention does not appear to have been bestowed upon the topic which his own paper has virtually suggested as the best heading for the present one; namely, the reliability of data when tested by the conclusions to which they lead. All who have pondered deeply on this subject, and have no special theory to support, will probably concur in thinking that tabular expositions, whether of English or Scottish data, are more or less trustworthy in exactly the same ratio as they do not ask us to reverse the natural conception: that the general scheme of human existence, like that of other parts of the animated creation, is first to grow and then to decay, and that both the growth and decay are happily so ordained, unless prevented by ignorance and vice, as to pursue the even tenor of their way, moment by moment and year by year, almost imperceptibly until the closing scene.

As individuals, daily observation teaches us that mortality is always at work, because we see deaths occurring at all ages, and such a reflection is obviously not without its moral uses, founded upon a sense of moral equity. But no such claim can be urged for a special hypothesis like the one we are considering, which asks us to suppose that the ratio of mortality is for a long period at a standstill, merely that it may afterwards hurry forward as if to overtake its neglected victims, and thus to disarrange without pretending to prolong the general span, long since sufficiently defined by the well-known saying of the Psalmist, so excellently rendered in Cranmer's version: "The days of our age are threescore years and ten; and though men be strong that they come to fourscore years, yet is

their strength then but labour and sorrow; so soon it passes away and we are gone."

Looking at the subject, then, in this light, that life has at least a defined limit, towards which we are obliged to progress as age progresses, it is one of the strongest *primâ facie* arguments of the reliability of data that they do not tend to contravene or weaken so obvious a conclusion. It is in this respect that the totality of the so called "Experience of the London Offices," expressly impugned by Mr. Spens because not confirming his theory, is especially valuable, and has fully justified the expectation of the originators of the experiment, that the reckoning by a mixture of lives and policies would not in such large numbers importantly differ from calculations based upon lives alone. It is, of course, easy to imagine a combination of policies that might produce erratic results; but the data in question have safely passed through such an ordeal, and, so far from contravening the general laws of mortality derived from a sufficient number of lives alone, have actually, in each and all of the policy-classes, brought a generally concurrent testimony of considerable value; and have thereby given quite as much support to the reliability of the Equitable and London Amicable experiences as has been derived from such experiences themselves. The trustworthiness, therefore, of the combined data in question, though originally a mere tentative experiment, must now be looked upon as an experiment no longer, but as resulting from materials worthy of being placed among the most valuable we possess, whatever may be thought of such future collections as may present themselves.

By undue subdivision of even the most perfect data, a diversity of opinions might be upheld, from an expected mortality of zero to one of cent. per cent.; and thus the only method (as already more than once hinted) left us, is to judge of the classification and reliability of data by looking to the conclusions to which they may lead us, and thereby avoid the re-presentment of those ancient paradoxes as to the confusion and the reversal of ages, which no statistician of modern times can ever hope to re-establish, however earnest he may be in his judgment, or sincere as to the consummate fitness of his own method of dealing with materials. To pass from youth to age, we must pass from year to year; and to suppose this progression towards eventual death among healthy persons in general, apart from unhealthy occupation, to be otherwise than gradual as to age, is to attempt to controvert the very argument which the presumption of health is best set up to establish.

In conclusion, it is hoped that in the present paper such a

mixture of courtesy and of dissent, free from personal satire, has prevailed, as may be deemed fitting for the occasion, especially as such elements are of all others the most easy to be departed from.

On the Valuation of Life Contingencies by means of Tables of Single and Joint Lives. By Charles James Hargreave, Esq., LL.D., F.R.S.

(Extracted by permission from the *Philosophical Magazine*, for Jan. 1853.)

Let $a_1, a_2 \ldots a_n$ be the reciprocals of the roots of the expression $1-s_1x+s_2x^2-\ldots\pm s_{n-1}x^{n-1}\mp s_nx^n$, which call ϕx. We have then $\phi x=(1-a_1x)(1-a_2x)\ldots(1-a_nx)$, from which the following series of values may be readily deduced, the Σ implying the sum of all the instances of the form placed under it, so that each expression is a symmetrical function of $a_1, a_2 \ldots a_n$.

$$\phi(1)=(1-a_1)(1-a_2)\ \ldots\ (1-a_n).\text{No. of terms, } 1.$$
$$-\phi'(1)=\Sigma a_1(1-a_2)\ \ldots\ldots\ (1-a_n).\text{No. of terms, } n.$$
$$\frac{1}{2}\phi''(1)=\Sigma a_1a_2(1-a_3)\ \ldots\ldots\ (1-a_n).\text{No. of terms, } n\,\frac{n-1}{2}.$$
$$-\frac{1}{2.3}\phi'''(1)=\Sigma a_1a_2a_3(1-a_4)\ \ldots\ (1-a_n).\text{No. of terms, } n\,\frac{n-1}{2}\,\frac{n-2}{3}.$$
$$\vdots$$
$$\pm\frac{1}{2.3..p}\phi^{(p)}(1)=\Sigma a_1a_2a_3\ldots a_p(1-a_{p+1})\ldots(1-a_n).\text{No. of terms, } n\,\frac{n-1}{2}\ldots\frac{n-p+1}{p}.$$
$$\vdots$$
$$\pm\frac{1}{2.3..(n-1)}\phi^{(n-1)}(1)=\Sigma a_1a_2a_3\ldots a_{n-1}\ldots(1-a_n).\text{No. of terms, } n.$$
$$\mp\frac{1}{2.3..n}\phi^{(n)}(1)=a_1a_2a_3\ldots a_n\qquad.\text{No. of terms, } 1.$$

The sign is positive when p is even, and negative when p is odd. A single term of the pth expression contains p factors of the form a, and $n-p$ factors of the form $1-a$; and the expression itself is the sum of every term which can be so constructed.

Let there be n persons whose names are $A_1, A_2 \ldots A_n$; and let a_p denote the probability that A_p will be living at any given future date. Then by what precedes, we see that the probability that at the given date there will be exactly p out of the set living (implying that exactly $n-p$ in number are dead), is

$$\pm\frac{1}{2.3..p}\phi^{(p)}(1).$$

Thus we have—

Probability that all are dead$=1-s_1+s_2-s_3+\ldots$,
Probability that exactly one is living$=s_1-2s_2+3s_3-4s_4+\ldots$,
Probability that exactly two are living$=s_2-3s_3+6s_4-10s_5+\ldots$;

and so on until we arrive at the probability that exactly one is dead, which is $s_{n-1}-ns_n$; and finally the probability that all are living, which is s_n.

In like manner, we observe that the expression

$$\phi(1)-\phi'(1)+\frac{1}{2}\phi''(1)-\ldots\pm\frac{1}{2.3..p}\phi^{(p)}(1)$$

represents the probability that p persons or less (including none) are living at the given date; and, omitting the first term, we have the probability that p persons or less are living, excluding the case of all dead. If $p=n$, the expression becomes $\phi(1-1)$ or $\phi(0)$ or 1, the event being certain.

By referring to the well-known process for obtaining the value of an annuity which depends upon the existence of any *status* of a contingent nature, the reader will without any difficulty at once perceive the correctness of the subjoined solution of the following problem :—

Problem.—To determine the value of an annuity during the continuance of any *status* which can be made to depend upon the life or death of any number of persons out of the set $A_1, A_2 \ldots A_n$.

Mode of Solution.—Find the probability (by the formulæ above given) that the *status* will be in existence after the lapse of any number of years; for $s_1, s_2 \ldots$ write their values $a_1+a_2+a_3+\ldots$, $a_1a_2+a_1a_3+\ldots$; and, if necessary, multiply the expression out, so as to get rid of all brackets; then for each small letter write the corresponding large letter; and the result is the value of the annuity in question expressed in values of annuities on single and joint lives, on the assumption that A_n means the value of an annuity on the life of A_n; $A_m A_n$ the value of an annuity on the joint lives of A_m and A_n; and so on for any number of persons. The most convenient notation is to consider these values as framed on the assumption that unity denotes the value of a present perpetuity; so that A_n means the ratio of the value of an annuity on the life of A_n to the value of a perpetuity, or the value of the annuity on the assumption that a perpetuity is 1. Calling A_n the value of such a *status*, the value of a perpetuity expectant on the determination or failure of the *status* is $1-A_n$. The preceding

rule, therefore, determines also the value of a perpetuity expectant on the failure of any *status* formed out of n lives, or payable only when the *status* does not exist.

The above mode of solution will be rendered plain by a few examples.

Let us take every contingency that can be made from the lives of A_1 and A_2. Here

$$\phi(1)=1-s_1+s_2, \quad -\phi'(1)=s_1-2s_2, \quad \frac{1}{2}\phi''(1)=s_2,$$

which give the following probabilities and values:—

Probability that both are dead is $\phi(1)$ or $1-(a_1+a_2)+a_1a_2$;
Value of perpetuity expectant on death of survivor, $1-(A_1+A_2)+A_1A_2$;
Probability that one or both are living, $a_1+a_2-a_1a_2$;
Value of annuity for two lives and life of survivor, $A_1+A_2-A_1A_2$.

These two instances are complementary to each other.

Probability that one only is living is $-\phi'(1)$ or $a_1+a_2-2a_1a_2$;

Value of annuity for life of survivor expectant on the death of one of the two is $A_1+A_2-2A_1A_2$; and value of present perpetuity, payment of which is suspended from death of first to death of second, is $1-(A_1+A_2)+2A_1A_2$.

Probability that both are living is $\frac{1}{2}\phi''(1)$ or s_2 or a_1a_2; value of annuity on joint lives is A_1A_2; value of perpetuity expectant on death of one of the two is $1-A_1A_2$.

Now let us take the contingencies from the lives of three persons, A_1, A_2, and A_3. Here

$$\phi(1)=1-s_1+s_2-s_3; \quad -\phi'(1)=s_1-2s_2+3s_3; \quad \frac{1}{2}\phi''(1)=s_2-3s_3;$$
$$-\frac{1}{2.3}\phi'''(1)=s_3.$$

Probability that all are dead is $1-s_1+s_2-s_3$; value of perpetuity expectant on death of last survivor is

$$1-(A_1+A_2+A_3)+(A_1A_2+A_1A_3+A_2A_3)-A_1A_2A_3;$$

and, taking the complement, we have value of annuity for the lives and life of the survivor

$$A_1+A_2+A_3-(A_1A_2+A_1A_3+A_2A_3)+A_1A_2A_3.$$

Probability that one only is living is $s_1-2s_2+3s_3$; and value of annuity for life of last survivor expectant upon the decease of both the others is

$$A_1+A_2+A_3-2(A_1A_2+A_1A_3+A_2A_3)+3A_1A_2A_3.$$

Probability that one or none is living is $1-s_2+2s_3$; therefore value of perpetuity expectant on the death of two of the three is $1-(A_1A_2+A_1A_3+A_2A_3)+2A_1A_2A_3$; and value of present annuity payable so long as two or more of the three are living is

$$A_1A_2+A_1A_3+A_2A_3-2A_1A_2A_3.$$

Probability that exactly two are living is s_2-3s_3; and value of annuity for joint life of the survivors expectant upon the decease of the first of the three is

$$A_1A_2+A_1A_3+A_2A_3-3A_1A_2A_3.$$

Probability that two or one are living is s_1-s_2; so that value of annuity for life of the two survivors and the survivor of them expectant on the decease of the first of the three is

$$A_1+A_2+A_3-(A_1A_2+A_1A_3+A_2A_3).$$

Probability that all are living is s_3; so that value of annuity for the joint lives of the three is $A_1A_2A_3$; and the complementary perpetuity is $1-A_1A_2A_3$.

The above formulæ thus solve every possible contingency that can be constructed out of a single set of existing lives, treating them always as a set, and abstaining, as we have done, from dividing the set into individuals; and the results are obtained by merely handling the formulæ without the necessity of entering into any consideration of the various contingencies that may arise. Among the more obvious results are the following, which I presume are well known. The value of a perpetuity expectant upon the death of the survivor of a set of lives is

$$1-\Sigma(A)+\Sigma(AA)-\Sigma(AAA)+\ldots;$$

and the value of an annuity for their lives and the life of the survivor is

$$\Sigma(A)-\Sigma(AA)+\Sigma(AAA)-\ldots;$$

the former being, (perpetuity) + (annuities for joint lives in even combinations) − (annuities for single lives and joint lives in odd combinations); and the latter being, (annuities for single lives and joint lives in odd combinations) − (annuities for joint lives in even combinations).

Let us now introduce another set of lives $B_1, B_2 \ldots B_m$, and construct a *status* out of them which is to coexist with the *status* constructed out of the former set. We have merely to find the probability of the new *status* being in force at a given time, and multiply it by the probability of the old *status;* and when the multiplications are performed, change the small letters into large ones as before. The same process may be extended to any number of coexistent *status.*

Thus, suppose we require the value of an annuity for the lives of A_1 and A_2, and the survivor commencing at the death of B_1; we have merely to multiply $a_1+a_2-a_1a_2$ by $1-b_1$; which gives, changing the letters,

$$A_1+A_2-A_1A_2-A_1B_1-A_2B_1+A_1A_2B_1.$$

The complexity of the *status* only increases the labour of working out the results, without in any way adding to the real difficulty of the problem. Thus, suppose we require the value of an annuity for the lives of A_1 and A_2 and the survivor of them, commencing at the death of such one of the set B_1, B_2 and B_3 as shall die second, with the proviso that it shall only be payable so long as there are either exactly two or exactly three of the set C_1, C_2, C_3, and C_4 living; we have to multiply together

$$a_1+a_2-a_1a_2,$$
$$1-(b_1b_2+b_1b_3+b_2b_3)+2b_1b_2b_3,$$
$$c_1c_2+c_1c_3+c_1c_4+c_2c_3+c_2c_4+c_3c_4-2(c_1c_2c_3+c_1c_2c_4+c_1c_3c_4+c_2c_3c_4)$$
$$+2c_1c_2c_3c_4;$$

and after the multiplications, to change the letters into the corresponding names. The result would be given in this case in terms of no less than 165 annuities on joint lives.

The preceding formulæ may be adapted to the case of contingencies involving not merely lives, but also a fixed term of years, it being assumed that the term, as well as the lives, begins to run *in præsenti.* Thus, if T denote the value of an annuity for a term, and A_1T the value of an annuity for so much of the term as A_1 shall live, all the results above given remain applicable if we substitute T for one of the lives. Thus A_1+T-A_1T is the value of an annuity for the term and the life, whichever shall last the longest; A_1+T-2A_1T is the value of an annuity for the residue of one period (the term or the life) after the other has expired. So $A_1+A_2+T-(A_1A_2+A_1T+A_2T)+A_1A_2T$ is the value of an annuity for two lives and a term, whichever shall last the longest.

In these investigations A_n denotes the present value of an annuity which is payable at intervals of a year from the present time, provided the life be in existence on the day of payment; the complement of this, or $1-A_n$, must therefore be understood as denoting a perpetuity expectant on the death of A_n, on the assumption that it commences in point of interest at the beginning of the year in which the life drops, or that its first payment takes place at the beginning of the year ensuing the fall of the life. Unless this assumption be made, the two added together will not constitute a

present perpetuity. In like manner, an annuity commencing at the death of A_1, and continuing until the death of A_2, is represented by $A_2 - A_1A_2$, on the assumption that it begins in interest at the commencement of the year in which A_1 dies. So, when we represent by $M(1-A_n)$ the value of a sum M payable on the death of A_n, we mean that it is payable at the commencement of the year of A_n's death; and if it be not payable until the end of that year, we must take a year's discount from it. The diminution of value occasioned by payment being postponed until the fall of a life or other *status* may be regarded as a particular mode of discounting the sum, the rate of discount depending on the nature of the *status*. Thus the value of M pounds payable at the death of the survivor of $A_1A_2 \ldots A_n$ is $M(1-\Sigma A+\Sigma(AA)-\Sigma(AAA)+\ldots)$; and the value of M pounds payable after the decease of n lives where they are not coexistent, but each life (or rather a life of that value) is nominated on the death of his predecessor (or more strictly at the beginning of the year in which he dies), is

$$M(1-A_1)(1-A_2)\ldots(1-A_n).$$

If all the lives have the same value P, the value of M pounds payable after the death of n such lives, each life being nominated at the commencement of the year in which his predecessor died, is $M(1-P)^n$; from which we at once perceive that the present value of a series of payments of M pounds, one made now, another expectant on death of P, the next expectant on the death of another nominee P, and so on *ad infinitum*, is

$$M(1+(1-P)+(1-P)^2+\ldots) \text{ or } \frac{M}{P};$$

and if such an interest be expectant on the fall of an existing life A_n, its value is $M(1-A_n)\div P$. Payments of this nature, which go by the name of fines, are in practice made payable at the end of the year in which the life falls, and the new life is not nominated until that time; this adds one year certain to the value of every life, so that $(1-A_n)$ becomes $v(1-A_n)$, and P becomes $1-(1-P)v$, v being $1\div(1+r)$, where r is the rate of interest per pound per annum. These give as the present value of such a fine $M(1-A_n)\div(P+r)$, which is in substance the same formula as that adopted by Mr. Milne.

The reader will be cautious not to confound $(1-A_1)(1-A_2)$ with $1-(A_1+A_2)+A_1A_2$; the former is the value of a perpetuity expectant on the death of two successive lives, the latter is a perpetuity on the death of the survivor of two concurrent lives of the

same respective values. If the former expression be multiplied out, it should be written thus: $1-(A_1+A_2)+A_1.A_2$, so as to show that the last term is a product, and not an expression of the value of joint lives. It is evident that in dealing with successive lives of different values, it is immaterial in what order they are taken.

The formulæ at the head of this paper may be applied not merely to lives, but to any other set of events, the individual probabilities of which are known. Thus if there are n events whose respective probabilities are $a_1, a_2 \ldots a_n$, then

$$\pm\phi^{(p)}(1)\div(2.3..p)$$

is the probability that exactly p will happen; and

$$\phi(1)-\phi'(1)+\frac{1}{2}\phi''(1)-\ldots\pm\frac{1}{2.3..p}\phi^{(p)}(1)$$

is the probability that p or less will happen; and so on.

Dublin, Dec 18, 1852.

Note by the Author.—In order to render the investigation quite complete, it is necessary to point out a slight and obvious modification of the formulæ, in case two or more of the lives concerned are not lives of the same value, but lives of the same person.

If we have two lives of the same value (A), we may obtain in the result annuities of the form AA, AAB, &c., which present no peculiarity. If, however, it should happen that the two A's are the same person, we must substitute A for AA, and AB for AAB, and so on; since it is evident that that which appears in the form of an annuity for the joint lives of A and A, where they are really the same person, is merely an algebraical mode of expressing an annuity for the life of A. This change may cause some of the terms to disappear, a circumstance which will generally be found to indicate either that the problem has not been proposed in the simplest form, or that the simplest mode of solution has not been adopted. Thus, an annuity for the lives of A_1 and A_2 and the survivor, to commence on the failure of the joint existence of A_1 and B (the two A_1's being, not two lives of the same value, but lives of the same person), results in the form derived from multiplying $a_1+a_2-a_1a_2$ by $1-a_1b$, or from $a_1+a_2-a_1a_2-a_1a_1b-a_1a_2b+a_1a_1a_2b$. The last two terms thus cancelling each other, we obtain $A_1+A_2-A_1A_2-A_1B$, which is evidently correct.

*The Life Assurance Controversy.**

IT was hardly to be expected but that an attempt to demonstrate the inconveniences arising from daily increasing competition in the business of life assurance should meet with resistance and reprobation. The large number of persons interested in novel undertakings of the character in question would naturally feel themselves aggrieved at statements which went to prove that such undertakings were mischievous because they could not be successful, and which sought to demonstrate their hopelessness of success by an exposé of their actual condition; on the other hand, it is not much to be wondered at, that minds familiar only with a state of affairs so wholly different should regard with anxiety and alarm a succession of enterprises threatening not merely to encroach on their own field of operation, but, by a series of failures, to bring all alike into general suspicion and discredit. As in most other controversies, much allowance is to be made on either side. The interests of the two parties are probably not altogether antagonistic, but they can scarcely fail to come into serious collision unless placed under more carefully devised regulations than at present exist.

*"Life Assurance: its schemes, its difficulties, and its abuses." "Letter to the Right Hon. Joseph W. Henley, M.P., President of the Board of Trade, regarding Life Assurance Institutions, &c. By Robert Christie, Esq., Edinburgh, Fellow of the Institute of Actuaries and Manager of the Scottish Equitable Life Assurance Society."—"Remarks on the above. By an Official of a Registered Company under the Joint Stock Act."—"On the Present Position of the Life Assurance Interests of Great Britain: a Letter to the Right Hon. Joseph W. Henley, M.P., President of the Board of Trade. By William Thos. Thomson, F.R.S.E., Manager of the Standard Life Assurance Company and of the Colonial Life Assurance Company, and one of the Vice-Presidents of the Institute of Actuaries."—"Further Suggestions with reference to the Amendment of the Joint Stock Companies Registration Act, as regards Life Assurance Institutions: contained in a Letter addressed to Francis Whitmarsh, Esq., Registrar of Joint Stock Companies. By the same Author."—"Actuarial Figments Exploded: a Letter to the Right Hon. J. W. Henley, M.P., President of the Board of Trade, in Defence of the Life Assurance Offices registered under 7 & 8 Vic., cap. 110. By Alexander Colvin, Actuary to the United Mutual Life Assurance Society."—"A Few Lines to the Managers of the Life Insurance Societies of the United Kingdom, suggesting a Remedy for the Doubts and Difficulties attendant upon the business of Life Assurance. By J. A. Beaumont, Esq., Managing Director of the Provident Life Office."—"Conspiracy Detected: in a Letter to the Right Hon. J. W. Henley, M.P., President of the Board of Trade, in Refutation of certain Statements published by Robert Christie, Esq., and others, on the subject of Life Assurance. By B. H. Strousberg, Consulting Actuary."—"Letter to the Right Hon. Benjamin D'Israeli, M.P., in Reply to several anonymous Articles and Letters in the *Times* and *Morning Chronicle*. By W. Swiney, A.I.A."—"Letter to the Right Hon. the Chancellor of the Exchequer, on Life Assurance Companies' Receipts and Expenditure. By John Grinsted."—"A Letter to the Right Hon. E. Cardwell, M.P., President of the Board of Trade, on the inoperative character of the Joint Stock Companies Registration Act, as a means of preventing the formation of Bubble Assurance Companies, or of regulating the action of those honourably and legitimately instituted. By J. Hooper Hartnoll, Proprietor and Editor of the *Post Magazine*."—Articles and correspondence in the *Post Magazine* and *Morning Chronicle*, passim.

It is perhaps to be regretted, but it will scarcely be denied, that the establishment and good conduct of an Assurance Company must at the present day be attended with considerable expense. Actuarial, legal, and medical knowledge, of even mediocre character, cannot be had but at much cost. An influential Board is very important, and an establishment of some pretension is all but essential. Experience has pretty well proved that these and all the other minor adjuncts of a respectable society can scarcely be got together and maintained at a less charge than three thousand pounds per annum, so that the income from annual premiums must be at least thirty thousand pounds per annum before the annual charge can be reduced to ten per cent.—a sufficiently heavy deduction, it will be admitted.

Now if we suppose that the average premium paid by each person is ten pounds, a society having the income above stated would consist of 3000 persons, and hence 200 such societies would comprehend 600,000 members: but it has been shown by Mr. Edwin Farren and others that the number of lives assurable at any one period in this country, of the class likely to effect assurances of such amount, is if anything less than this; and if such be the case, and if the average premium have been assumed correctly, we obviously arrive at the conclusion that the number of societies cannot much exceed 200, or the average annual expense of life assurance must be greater than ten per cent. on the premiums paid. Without pretending to rigid accuracy in these assumptions, we would submit that they are not far from the truth, and that they are very much confirmed by the extreme difficulty universally felt at the present time in very materially increasing the number of the assured, due allowance of course being made for such as merely supply the annual decrement naturally occurring amongst them.

It is possible that hereafter a class of persons may be induced to resort to Insurance Companies which now contents itself with such means as Friendly Societies afford: but at the present day very little disposition is shown by them to make the desired change; and it is clear that unless large numbers can be induced to make it, the support given by their means to the Insurance Companies must be quite insignificant. The only other means which occur to us of alleviating the pressure, is a reduction in the expenses of these establishments; but this, as we have said, is hardly to be effected. There is perhaps one item which is now needlessly expensive, whatever it may have been formerly. The influence which a Board of Directors could exercise years ago is, in a great measure, destroyed

by the keenness of the present competition, and more energetic measures are now necessary than they can be expected individually to bring into play. Hence their functions, all important at an earlier period, have to a certain extent become obsolete; and the heavy expense usually incurred on this head might, we think, be judiciously lessened. As, however, it would be necessary in such a case to secure the services of a very competent managing actuary, and also to establish a more efficient system of audit than is now usually adopted, evidently but a small saving could be effected in this way.

From the foregoing considerations it is clear that the interests of the existing Companies, no less than those of the public, imperatively demand some check to the formation of additional ones; and none appears to be more reasonable and proper than the insisting on a capital of sufficient amount being paid up before license be given for commencing business. This is one of the stipulations made with reference to Joint Stock Banks; and surely it is quite as necessary in the case of Assurance Companies, whose bills are payable at a much longer date than those which Banks are accustomed to deal in. The proposition that the accounts should be made out in a certain form, is, we think, upon the whole not a wise one. The same thing was attempted for the Banks, and was, after consideration, rejected—Sir Robert Peel himself observing on the impossibility of arranging any form which would ensure a statement free from obscurity, intentional or otherwise, and which would necessarily exhibit the state of affairs in an entirely satisfactory manner. Powers might perhaps be given to the Board of Trade to require from the Companies any particulars which they might consider essential for elucidating the statements put forth by them, but the expediency of this is doubtful. Probably no better course can be taken than to leave this part of the business to the Companies themselves: their own interest will lead them all to publish their accounts fully and clearly so soon as the public begins to show more decidedly its preference of such Offices as make it their practice to do so.

There is, however, one other measure which we cannot help thinking would very materially tend to bring about a more wholesome state of things in the assurance world than we can now boast of. At the present time, any individual, let him be ever so incompetent, may assume the name of actuary and commence practising as one, without any restriction whatever; and hence a dangerous facility is afforded for the formation of crude and ill-devised schemes

of assurance. This, at all events, should be prevented, and might very readily be, if the Government would entertain and carry out such a bill as the one for regulating the profession of au actuary, published in the first Number of this Magazine. If, however, that be considered of too stringent a character, let a legal registry be made of the persons now calling themselves actuaries, and let it be declared penal for anyone not so registered to act in that capacity. The Institute has done its best, by its lectures and examinations, to provide in future a better class of functionaries of this description than have hitherto been readily to be met with. Let the Government, if it will not give that body the requisite powers, provide similar means, and insist upon a satisfactory certificate or certificates from competent professors as the condition of future enrolment on their register. Were such means as these adopted, the public would be greatly protected from the evil consequences they are now exposed to by the continual efforts of ignorant projectors, and might fairly have confidence in the ability and integrity of those with whom they would, under such circumstances, have ultimately to deal; we say ultimately, because of course some persons must, in the first instance, be placed upon the register whose fitness for such a position may possibly be questioned, and hence the proposed measure would not have immediately all the effect to be desired. This, however, is an evil quite unavoidable, and one which must evidently be endured, or the present state of things allowed to continue, in which case the profession must abandon the hope of any very material elevation in its status, and one great means at least be lost of remedying the disorder in assurance matters so universally complained of.—Ed. *A. M.*

On the Life Assurance Companies of Germany—their Constitution, Condition, and Prospects: being the substance of a Paper presented to the Institute of Actuaries by HERR RATH G. HOPF, *Manager of the Lebensversicherungs Bank für Deutschland in Gotha.*

[Read before the Institute of Actuaries, 29th November, 1852, and ordered by the Council to be printed.]

(Continued from page 147.)

V. The life assurance branch of the General Assurance Company (*Assicurazioni Generali Austro Italiche*) in Trieste was established in 1834 as a separate branch of business of this Company, which also undertakes fire and marine assurance; and its operations extend not only to all Austria and Germany, but also to other European countries, and especially to Italy. It is a purely Proprietary Company, the assured receiving no part of the profits of the Company. The security for the fulfilment of the Company's engagements is a share capital of two millions gulden (£200,000), in 2000 shares of 1000 gulden (£100) each, of which 10 per cent. is paid up. One half of the capital is specially set apart for the guarantee of the life and annuity business. The Company offers to the public the choice of a great variety in the modes of assurance. Assurances for the whole life, for fixed periods of years, of sums deferred for a given time—assurances of the sum payable either in case of death or on attaining a given age—survivorships, the last with the return of premiums in case of the life against which the assurance is made dying first—as well as endowments and life annuities—are granted. As in other established Companies, by far the greater part of the business consists of the single assurances for the whole life, and the other modes are resorted to but seldom. The premiums appear to be computed on some peculiar data, or a table not generally recognized. As for the extent of the assurance guarantee, it is to be mentioned, that it does not extend to the risk of active military service, although, as well as the risk in actual warfare, it may be secured by a proportionate premium; that licenses are granted for travelling in Christian Europe, or for sea voyages in time of peace of not more than 150 Italian miles, from one port to another (the ports of Turkey excepted); and that, in case of death by suicide, duelling, by the hands of justice, or in imprisonment, no payment is made. For longer sea voyages the Company allows a corresponding extra premium to be paid, pro-

vided that the duration of the voyage out and home, and including the residence, shall not exceed one year; for voyages in the European seas, of a greater distance than 150 Italian miles, from $\frac{1}{4}$ to 2 per cent. of the sum assured; to the United States, the Brazils, Columbia, Buenos Ayres, the Isles of France and Bourbon, 2 to 3 per cent.; to the East Indies, 3 to 4 per cent.; to the South Seas, China, and Japan, 4 to 5 per cent.; to Mexico, Senegal, and Cayenne, 3 to 5 per cent.; to Egypt, the Levant, and Barbary, 2 to 4 per cent.; for the first voyage to the Antilles, 8 per cent. Surrender value and loans are only given, at the discretion of the Board, for policies which have been a certain (?) number of years in existence. Persons who are assured before 50 years of age only pay their premiums to 85 years of age, and on attaining their 90th year receive the sum assured in their lifetime.

VI. The Berlin Life Assurance Company (*Die Berlinische Lebensversicherungs Gesellschaft in Berlin*) was established in 1836, and is constituted, like the Lubeck Company, as a mixed Proprietary Company, the assured as well as the shareholders taking a share of the profits, although they are not entitled to take part in the management. The share capital consists of 1,000,000 thalers (£142,857), in 1000 shares of 1000 thalers (£143) each, 20 per cent. of which is paid up, and bears an interest of 5 per cent. The surplus would accumulate as an assurance fund, as in the Gotha and Leipzig Companies, for a period of five years, and during that time is liable to the losses that may arise. At the termination of this period the surplus of the first year of the period is applicable for division of profits, of which the assured for the whole term of life receive two thirds and the shareholders the other third. The dividends, which have been paid to the assured by deductions from the premium, in this manner have fluctuated between $14\frac{1}{7}$ and $16\frac{2}{3}$ per cent. of the premiums payable, and on the average have been equal to $14\frac{1}{2}$ per cent.

The Company undertakes assurances of sums from 100 to 10,000 thalers (£14·3 to £1430) upon the lives of healthy persons for their whole duration, for fixed periods of years, for survivorships, and for two lives (in the latter case payable either on the death of the first or second). Life annuities are granted, but only in cases where the party entitled to the sum assured wishes to receive it in the shape of a life annuity. The Company offers a peculiar arrangement in the assurance of a provident fund, whereby it engages to pay the sum assured after the lapse of any given number of years not exceeding 25, on the stipulation that the

assured shall pay the premium only so long as he shall live within the given period.

The premiums of the Berlin, like those of the Lubeck Company, are deduced from those of the Equitable Society in London, and its policies are valued as has been previously explained.

With regard to the liberty of travelling allowed to the assured, the regulations are similar to those of the Gotha Bank; and in like manner is payment made according to the customary surrender value, in case of the death of the assured by suicide or duelling. This value is not fixed, but depends in each particular case upon the discretion of the Board.

If the assured enters upon active military or naval service, or any other dangerous occupation, or undertakes any sea voyages without a license, the claim is void; but the Company is willing to guarantee, on payment of a corresponding extra premium of 3 per cent. on the sum assured, the risks of Prussian military officers, even during war time.

VII. The Munich Life Assurance Company (*Die Lebensversicherungs Anstalt in München*) forms a branch of the Loan and Discount Bank (*Hypotheken und Wechselbank*) of that place, and was established in the year 1836. Being a pure Proprietary Company, it allows the assured no part of the profits, which belong only to the shareholders of the Bank, whose funds form the guarantee for the fulfilment of the life assurance as well as all other contracts. The fundamental regulations of the Company, so far as they have reference to the management of the life assurance business, conform very much to the older constitution of the Gotha Bank. The Bank only allows a value for surrender in case of a voluntary withdrawal on whole life policies which have existed at least for five years. In other cases, in which the assurance ceases by travelling beyond the limits, by war service, or is void by suicide, duelling, &c., no compensation is allowed.

The Company confines its operations to the kingdom of Bavaria, and undertakes only assurances for whole life or fixed periods of years, in sums of from 300 to 25,000 gulden (£25 to £2,083) on one life, and accepts only healthy persons.

VIII. The General Mutual Capital and Annuity Assurance Company in Vienna (*Die Allgemeine Wechselseitige Kapitalien und Rentenversicherungs Anstalt in Wien*) was formed in 1840, and classifies in different branches the kinds of assurances which it undertakes, in six divisions:—

1. Assurances payable in the event of the assured living to given age.

2. Ordinary assurances payable on death, but only made for whole life, and not for short periods or survivorships.

3. Life annuities, immediate or deferred.

4. Pensions and survivorship annuities.

5. Survivorship annuities in favour of children till they attain 24 years of age.

6. Increasing annuities by way of Tontines.

Each of these branches accumulates and divides the surplus amongst its own members, and is kept distinct from the other; but for the first five branches a common guarantee fund has been formed, which is liable to contribute to losses in any of these branches in which it may be required. Towards this guarantee fund 40, 25, and 10 per cent. of the surplus are successively reserved until it amounts to 20 per cent. of the total separate funds of all the branches. The surplus is ascertained every three years, and after making the above reserve for the guarantee fund, is divided in proportion to the premiums paid since the last period of division, excluding the last year. According as a member enters nearer to or further from such a period of division, his enjoyment of the profits may be deferred from five to seven years. The first balance, ascertained at the end of 1846, embraced double the above period; the second was taken at the end of 1849. The former allowed of a yearly dividend, according to the duration of the assurance, of $33\frac{1}{3}$, 22, and 11 per cent., and the latter only 13, $8\frac{2}{3}$, and $4\frac{1}{3}$ per cent. Since in the latter period the actual mortality was only two-thirds of what might have been expected (the deaths having been only 95, when 135·36 was the computed number), and in the former period the proportion of the mortality was not so favourable, it is altogether inexplicable why the dividends should have been so much smaller in the last period than in the first. Possibly the method of ascertaining the surplus may not be correct, and the full value of the gross premium to be expected may have been taken into account in one case, and in the other only the net amounts of premiums deduced from the true table of mortality. With reference to this diminution in the dividends, and the profits varying according to the duration of the assurance, it is difficult to find an average value which represents the position of the policies of different duration; but we believe it will not be estimating the five dividends at too low a rate, to assume that they may be reckoned, on the average, at about 20 per cent.

The premiums for life assurance appear to be computed from the Süssmilch-Baumann table of mortality, at 4 per cent. interest.

Besides the proportionate premiums, the assured have to pay an entrance fee, and a yearly contribution to the expenses of 1 per 1000 on the sum assured. From 10 to 20,000 florins (£1 to £2,000) may be assured on one life. In regard to the condition of assurance, one regulation is peculiar, viz., that every person assured must pass a *trial year;* and if he dies in the first year, the sum assured is not paid, but only the premium, without interest and less the contribution for expenses, is returned. The return of all the premiums, without interest and less the contribution to expenses, is allowed when the policy lapses by suicide or duelling, or by the assured entering into active naval or military service. No compensation is allowed to the assured for voluntary withdrawal; but if through unforeseen circumstances he is unable to continue his payments, he may exchange the policy for one of a proportionately smaller amount without any or with a smaller future payment. No information is given as to the liberty allowed for foreign travelling.

IX. The Brunswick General Assurance Company (*Die Braunschweigische Allgemeine Versicherungs Anstalt*), on the mutual principle, was established in 1842, and formed by an extension of the scheme of the General Widows' Annuity Pension Society, already existing since 1824. Besides life assurances for whole life or fixed periods, in sums of from 100 to 5000 thalers (£14·3 to £714·3) on one life, it undertakes annuities, immediate or deferred, and survivorship annuities for widows, and keeps each branch distinct, as well as the original widows' pension scheme, thus making four branches of its business. For the necessary calculations, the table deduced by Brune from the mortality experienced in the Prussian Widows' Pension Society has, with slight modifications, been taken as the groundwork, and the premiums have been computed therefrom at 3 per cent., with an addition of 10 per cent. thereon. These computations have been made on the safest and most prudent considerations; and the knowledge and experience with which the statutes have been framed are conspicuous in the correct theoretical principles which distinguish them. By the statutes, the operations of the Society extend over all Germany; but at present it has only established agencies in the duchy of Brunswick and in some parts of the kingdom of Hanover. This explains the moderate amount of business with which they have commenced. At the end of 1850 there were—in the original Widows' Pension Society, 470 members, with 30,838 thalers (£4,405) per annum assured as pensions; in the new widows' pension branch, 199 members,

with 12,165 thalers (£1,738) per annum assured as pensions; in the life assurance branch, 604 members, with 321,100 thalers (£45,871) sums assured; and in the life annuity branch, 47 members, with annuities of 2,850 thalers (£407).

The conditions of life assurance are in substance similar to those of the Gotha Bank, from whose statutes several of the regulations as to the annulling or temporary suspension of the assurances are taken. As to the value allowed for surrender, and the mode of dividing the surplus, the Brunswick Company follows some peculiar arrangements, which are different from those of all other Companies, and which deserve more particular mention here.

No return is made on the voluntary withdrawal of a member. Those who are compelled to give up their policies in consequence of going to reside out of Germany, or by reason of military or naval service, or on account of imprisonment for criminal offences, as well as those who can give good grounds for their withdrawal, and such as are sufficient to satisfy the Board, may receive compensation. In these cases the premiums must have been paid for at least five years. On these conditions two-thirds of the value of the policy will be given, but without any further claim on the profits, whether already divided or not. This allowance will also be made in cases of death by suicide, duelling, or the hands of justice.

Every five years, after making a sufficient reserve by the tables on which the premiums are calculated, the surplus is divided in the proportion of two-thirds to the existing members of the class to whom the surplus belongs, provided they have been members for at least five years at the date of division, and one-third is set aside as a guarantee fund. The division is made amongst the members who are entitled thereto, in proportion to their actual interest in the Company—that is, to the value of each policy; and the share of surplus allotted to the assured will, if he desires it, be paid at once, or be applied as the purchase-money, at his then age, of a further life assurance policy payable at his death. From this option the unhealthy members of the Society would make a profit by the last method, in case of early death, whilst the healthy members would prefer the immediate payment. It follows also from the allotment of the bonus in proportion to each member's interest in the policy, that his share of the surplus increases with the value of his policy; and consequently, the proportion due to new entrants will be in future more unfavourable to them than it now is. We cannot, therefore, consider the value of the policy to represent the true proportion of the share in the surplus, which principally grows out

of the additions to the premiums. This addition may bear a proportion to the premium itself, but not to the value of the policy, with which it has very little connection. If, as is commonly the case, the per centage of addition to the pure premium is equal at all ages, and the premium is computed at the actual interest realized by the investments of the Company, or differing very slightly from it, then is the gross amount of premiums paid by each assured in the period for which the profits are ascertained the true proportion for his share of the surplus accumulated in that interval. By considering the value of the policy, or the premiums paid before the period in question, the older members would profit more than those who were admitted within that period; and this preference will act in classes according to the different standing of the policies as to membership in the Society.

The only division of profits which has yet been made in the Brunswick Company was at the end of 1849, and afforded a dividend of from 8 to 12 per cent. on the premiums paid on each policy up to that time.

X. The Frankfort Life Assurance Company (*Die Frankfurter Lebensversicherungs Gesellschaft in Frankfort-à-M.*) was founded in 1845, and possesses a guarantee capital of 3,000,000 florins (£250,000), in 6,000 shares of 500 florins (£41⅔) each, of which 10 per cent. is paid up. According to the statutes, the members assured for the whole life share in the profits of the Company; but up to the present time no such division has taken place, nor is the proportion in which they partake definitively fixed. The Company undertakes assurances for whole life, for short periods, survivorship, deposit assurances, endowments, and life annuities of different kinds. The premiums for assurances are nearly the same as those of the Gotha Bank for short period assurances without any variation, but for the whole duration of life being less by 1 to 4 groschen in 100 thalers (3⅓ to 13⅓ per cent.)

The assured may at pleasure travel in the Christian countries of Europe, and voyage on the North and Baltic Seas during the favourable months from 1st of April to 1st of October, and as far as Havre to Portsmouth, without forfeiting the assurance. Other and longer journeys require a license from the Company, and the payment of an extra premium. If an assurance for whole life be voluntarily given up, or become void by military or naval service, or travelling beyond the limits, or by suicide, duelling, or the penalty of the law, the holders of the policy (provided it has existed three years) may receive a certain return, at the discretion of the Board.

XI. The Hammonia Life Assurance Society (*Die Lebensversicherungs Societât Hammonia in Hamburg*) was established in 1845, to provide Hamburg with its own imitation of the Gotha Bank, which there enjoyed much confidence. For this purpose the regulations and rates of the Gotha Bank were borrowed word for word; and several of the examples and prospectuses of this Company were adopted without alteration, in the hope that by this means such an attraction would be held out to the public that the Hamburg copy might share in the same success as the original. But this expectation was only very slightly fulfilled. The success of the Hammonia was but small, and it experienced so many heavy losses by death, especially in the year 1849, that the managers found it necessary to alter the plan they had adopted. It was therefore decided shortly to close the Company and convert it into a proprietary one, and not only to restrict the business in many classes of assurance, but to adopt new rates and regulations. Whether the greater part of the share capital of 1,000,000 marcs banco (£75,000), whereof 10 per cent. is to be paid up, is subscribed, or what success has attended the change of measures, is not yet known. In the Summary Table I. the premiums hitherto charged are given.

XII. The Life and Annuity Assurance Company Janus, in Hamburg (*Die Lebens und Pensions-versicherungs-gesellschaft Janus in Hamburg*), founded in 1847, is constituted as a mixed Proprietary Company. The members assured for whole life, survivorship, endowment, or joint life policies, share in the profits of the Company, if they pay the premiums on the higher scale. The amount allotted to the assured is 7-10ths of the profits every four years, in proportion to the premiums paid, and is given either in cash or by deduction from the subsequent payments of premium. The share capital is 1,000,000 banco marcs (£75,000), in 200 shares of 5,000 banco marcs each (£375), of which 10 per cent. is paid up.

The Company is prepared to undertake all known kinds of life and annuity assurances, and for this purpose has published a large number of tables to satisfy all the inquiries needed. It confirms what has been already stated, that single whole life or short period assurances prevail to a far greater extent than any other classes, which have more of a theoretical than practical value. Out of 13 different classes, there were, at the end of 1850, only 6 in which assurances had been effected, viz., 1,879 whole life and short period policies on single lives, for 3,542,399 marc banco (£265,680); 99 survivorship and joint life assurances, for 130,520 marc banco (£9,789); 11 immediate annuities, 3,054 marc banco (£229); 28

deferred annuities, 5,638 marc banco (£423). The Company undertakes assurances from 100 marc banco (£75) to an indefinite amount on one life, and receives the premiums, not only by half-yearly and quarterly, but also, with a certain allowance for interest, &c., by monthly payments. Assurances may be effected with or without participation in profits. It is not known from what table the premiums are deduced.

With regard to the extent of the assurance guarantee, it is to be remarked, that the assured may travel in any part of Europe, and make voyages in steam vessels on the North and Baltic Seas, and as far as Havre and Portsmouth. In cases of death arising from a dissipated course of life, or by the hands of justice, the policy is void. If the assured destroy his own life, or perish in a duel, the same value is allowed as on the surrender of the policy. This amount is not fixed, but depends on the discretion of the Board, and is only given when the policy has existed for three years. Military and naval service, and travelling beyond the limits allowed, will render the policy void, unless the assured has obtained a license and paid the extra premium required by the Board.

The above are the principal regulations, at the present time, of the twelve German Life Assurance Companies now in operation; but as life assurance in our country is still only in process of extension, that number of Companies is not to be looked upon as the total development of this branch of business. An increase has indeed already begun to show itself, since the *Azienda Assicuratrice* in Trieste, established as a Proprietary Fire Assurance Company in 1822, has recently extended its operations to life assurance. The like object has been taken up by the first Austrian Assurance Company (*Erste Österreichische Versicherungs Gesellschaft*) in Vienna, founded as a Proprietary Company in 1824. The establishment of new Proprietary Companies in Leipzig, Stettin, and Cologne, where two have been projected, and of a Mutual Company in Stuttgard, tend to the same result, and the number of German Companies above mentioned will probably be increased by more than one-half; and the public will thus, from different quarters, be encouraged to profit by the system. What novel and peculiar advantages these new Companies may offer, is yet to be seen.

With our own native Companies some of the English Companies have lately entered into zealous competition, and by means of their agents have taken an active share in the business. We may mention the Union, the Royal Exchange, the Crown, the Universal, the Globe, the Medical, &c., of which the Globe and the Medical

(the latter because it assures unhealthy lives at corresponding higher premiums—a branch of the business only carried on to a very moderate degree by the German Companies) seem to be doing the greatest business. In general, the confidence of the public leans to the side of the native Companies, and with reason, for they emulate the foreign Companies in their security, in the equity of their conditions, and in their honourable and business-like character, but excel them in the facility and cheapness with which the settlement of claims may be made; and that in case of an appeal to law, the public not only understand the German laws by which the claim may be supported, but have also the power to enforce the sentence.

In Table I. will be found a comparison of the premiums which the above-mentioned German Companies charge per cent. for an assurance for the whole of life. The table also shows the dividends which the mutual and mixed Proprietary Companies have distributed on an average from their commencement to the present time, and what is the net premium resulting therefrom at the different ages of entering, without regard to the earlier or later period at which the dividends have been made. Whilst it is thus made clear what is the actual annual cost of an assurance according to the different ages of entering, it may also easily be computed therefrom how long the premium must be paid, so that, laid out at interest, it may equal the sum assured. Every one intending to effect an assurance should keep this in view; he would thus often form a more correct judgment on the real premium necessary to fulfil the engagement. For a life 40 years of age, the pure premium varies from 2½ to 3 per cent. Without fixing on any Company, we will assume the medium rate to be 2·75 per cent. If any one, therefore, would set apart this amount every year, and never drawing upon his accumulation, but always laying it out at compound interest at 4 per cent., which in practice he would have some difficulty to do, he must continually save for nearly 23 years, and attain the age of 63 years, before his savings would have accumulated to 100 thalers (or £14·3). How many temptations in this long period might occur to induce him to break in on his accumulations, or even entirely to dissipate the sum saved! But if he deposits this sum with a Life Assurance Company, he is sure, up to his 63rd year, not only to leave to his representatives all these payments with interest, but even considerably more, if death overtakes him at an earlier period. It is only when he has passed that age that the advantage turns against his heirs; and in this respect it

must be viewed as an equivalent to the certainty which he has hitherto enjoyed of leaving to them the full sum assured, when he had only accumulated a small part of it.

In regard to the age for which the premium is charged, all the Companies do not observe the same rule. In the Gotha, Leipzig, Munich, Vienna, Brunswick, as well as in the Hammonia, the assurer is taken at the younger age if within six months from his last birthday, and at the next age if older. The Berlin Company considers every year of life which has begun as if it were complete; and this appears to be the custom also with the Hanover, Trieste, Frankfort, as well as the Janus Companies, although no special rule is found in their statutes. In considering the difference of premiums, it is further to be taken into account that the Lubeck, Leipzig, Trieste (with certain limitations), and Berlin Companies allow the assured to cease paying the premium at 85 years of age; and that in such cases the Lubeck and Leipzig pay the sum assured immediately, the Trieste Company on the assured attaining 90 years, and the Berlin Company on his death; whilst the Gotha, Hanover, and Hammonia make the payment at 90 years of age, when the premiums cease; the Munich, Vienna, Brunswick, and Frankfort, and the Janus, continue to receive the premiums until death, and then only pay the claim.

Table II. shows the position of all these Companies up to the latest date to which their accounts have been published. The result is, that at the end of 1850 a total sum of nearly 52,000,000 thalers (about £7,430,000) was assured by them on the lives of about 41,500 persons in case of death, and that to meet these risks the current payments of premiums for the last year were about 2⅓ millions thalers (about £334,600), including the interest on the accumulation of former premiums. A portion of the risks have already fallen in, and in the last year 823 families profited by the prudence of the assured, to the extent of 1,136,457 thalers (£162,350), so that the average amount assured by each was 1380 thalers (£197).

Of the premiums which have been paid in by existing members, about 10,000,000 thalers (about £1,430,000) remain in the hands of the Companies as assurance funds, independent of the share capitals nominally of 5,124,285 thalers (£732,040), of which 612,428 thalers (£87,500) have been paid up as a security for the fulfilment of their engagements in future.

The assurances undertaken by the English Companies in Germany amount to about one-tenth of those of the native Companies.

The total sum assured by the people of Germany may, at the end of 1850, be computed at about 57,000,000 to 58,000,000 thalers (£8,143,000 to £8,285,700). Nearly one-half of this amount is effected with the Gotha Bank. The extent to which some of the German Companies have carried on their operations out of the country is not worthy of much discussion.

The total business of the German Life Assurance Companies is still very small, compared with the remarkable activity with which this branch of assurance has been developed in England, the number of the assured there being five or six times, and the amount of assurances effected eighteen times, as great. Nevertheless, it is a good beginning; and when we consider that 150 years had elapsed from the formation of the first Life Assurance Company in England before this satisfactory result was obtained, the success which in Germany has followed the labours of 22 years gives the most encouraging hopes for the future.

There are several grounds on which these expectations may be justly entertained. The knowledge of the meaning, the advantages, and the methods of assurance, has not yet penetrated all ranks of the people. How many of our countrymen, if they were but acquainted with the benefits of life assurance, would gladly avail themselves of it as a provision for their families! The progress of civilization and the increase of intellectual education will be followed by a wide extension of this knowledge. The existing Life Assurance Companies, by their agents and publications, are using their best endeavours to explain the system. Whilst the number increases of those who seek in these Companies a refuge against the uncertainty of the future—whilst the number of cases are multiplied in which families, suddenly deprived of their protector by death, are preserved by it from poverty and distress—the knowledge of its practice and its benefits will spread far and wide, and public attention will be drawn more forcibly to an institution which, in spite of its 20 years' existence and trial, is still called new for Germany. S. B.

TABLE I.—*Showing the Gross Premium per Cent., the Average Dividends, and the Net Premium after Reduction, in the German Life Assurance Companies.**

Name of Company.	Average Dividend per Cent.	Age 20.			Age 30.			Age 40.			Age 50.			Age 60.		
		Gross Premium.	Dividends.	Net Premium.	Gross Premium.	Dividends.	Net Premium.	Gross Premium.	Dividends.	Net Premium.	Gross Premium.	Dividends.	Net Premium.	Gross Premium.	Dividends.	Net Premium.
Gotha	24	2·097	·503	1·594	2·633	·632	2·001	3·386	·813	2·573	4·733	1·136	3·597	7·161.	1·719	5·442
Lubeck ..	·231 on sum assured	2·181	·231	1·950	2·669	·231	2·438	3·400	·231	3·169	4·531	·231	4·300	6·367	·231	6·136
Leipzig ..	16	2·097	·335	1·762	2·633	·421	2·212	3·386	·542	2·844	4·733	·757	3·976	7·161	1·146	6·015
Trieste....	Non profit	..	..	1·89	..	..	2·42	..	..	3·21	..	..	4·66	..	..	7·25
Berlin	14½	2·181	·316	1·865	2·672	·387	2·285	3·400	·493	2·907	4·533	·657	3·876	6·367	·923	5·444
Munich ..	Non profit	..	..	1·917	..	..	2·433	..	..	3·183	..	..	4·517	..	..	6·933
Vienna ..	20	1·883	·357	1·526	2·483	·477	2·006	3·333	·647	2·686	4·733	·927	3·806	6·967	1·373	5·594
Brunswick	10	1·930	·193	1·737	2·382	·238	2·144	3·187	·319	2·868	4·660	·466	4·194	7·479	·748	6·731
Frankfort	Non profit	..	..	1·958	..	..	2·491	..	..	3·283	..	..	4·658	..	..	7·133
Hammonia	No dividend	2·097	..	2·097	2·633	..	2·633	3·386	..	3·386	4·733	..	4·733	7·161	..	7·161
Janus	Non profit	..	..	1·717	..	..	2·225	..	..	2·950	..	..	4·100	..	..	6·491

* We have altered the arrangement of this table, and given the premiums for every tenth year, as sufficient for comparison. In the original, every fifth year of age is given.—ED. *A. M.*

TABLE II.—*Showing the New Business and Position of the Life Assurance Companies of Germany.*

Established.	Name of Company.	Year.	Assurances existing at the beginning of the Year.		New Assurances during the Year.		Assurances existing at the end of the Year.		Income (Premiums and Interest).	Claims paid.		Expenses of Management.		Assets.	Assurance Fund.	Clear Surplus.	Share Capital.	
			Persons.	Sums.	Persons.	Sums.	Persons.	ums.		Persons.	Sums.	Absolute.	Per Cent. of Income.				Nominal.	Paid up.
				£		£		£	£		£	£	£	£	£	£	£	£
1829	Gotha . . .	1850	15,471	3,517,014	1,138	265,786	16,082	3,643,457	162,748	325	79,943	6,775	4·16	859,565	704,345	134,880	Mutual	Mutual
1829	Lubeck . .	1850	*2,000	426,125	*200	45,138	*1,950	416,800	18,743	77	19,656	2,150	11·47	53,144	..	none	72,857	7,286
1831	Leipzig . .	1850	4,413	744,300	209	29,814	4,424	740,500	33,126	97	16,500	1,863	5·62	160,125	143,327	11,855	Mutual	Mutual
1831	Hanover . .	1850–1	2,802 Policies.	225,857	166 Pol.	17,600	2,890 Policies.	237,600	7,602	66	6,386	526	6·91	32,526	..	none	Mutual	Mutual
1834	Trieste . . .	1849	*2,000	419,143	*260	*57,143	*2,150	451,060	25,036	..	..	..	..	45,993	..	9,185	200,000	20,000
1836	Berlin . . .	1850	6,619	1,110,157	451	75,929	6,796	1,136,100	56,410	149	29,071	4,121	7·31	203,049	162,450	40,598	142,857	28,571
1836	Munich . .	1850	1,111	125,208	231	20,257	1,265	135,501	*5,714	15	1,167	..	..	22,111	..	..	Capital of the Loan Bank.	
1840	Vienna . . .	1850	1,594	133,397	189	17,517	1,702	143,984	7,025	*22	1,801	822	12·11	21,379	..	3,858	Mutual	Mutual
1842	Brunswick .	1850	496	37,371	129	10,014	604	45,871	1,366	16	886	..	..	4,136	..	..	Mutual	Mutual
1845	Frankfort . .	1850	*420	78,571	169	34,566	570	108,839	5,184	7	1,270	980	18·88	8,571	..	..	244,898	24,490
1846	In Hamburg—Hammonia .	1850	830	71,986	*230	17,857	1,063	79,843	2,396	15	1,057	1,068	44·57	2,030	..	..	Mutual	Mutual
1847	Janus . . .	1850	1,181	164,002	983	126,864	1,978 Policies.	262,351	9,270	34	4,614	2,024	21·83	6,228	..	..	71,429	7,143
	Total .	..	38,937	7,053,131	4,355	718,485	41,474	7,401,906	334,620	823	162,351			1,418,857			732,041	87,490

* Approximated.

NOTES AND QUERIES.

ON THE PERIOD INTERVENING BETWEEN THE DATE OF DEATH AND PAYMENT OF SUM ASSURED.

THE usual system of calculating premiums is founded on the supposition that the sum assured is payable in each case at the end of the year of death, or at that period at which the next renewal premium would have become due. In practice, however, in place of adapting this system to every case, an average period of six months after death was formerly adopted and is still current in some Offices, while others have reduced the term to three months, and some to no more than as many weeks. It thus becomes a matter of some little importance to determine the premium fairly chargeable for a sum assured to be due at the instant of death, and to bear interest until the date of actual payment.

Historically speaking, the subject strictly begins with De Moivre, who was the first to teach us how to assess the value of a reversion. Simpson, who was a rival, and Dodson, who was a disciple, were nevertheless somewhat indiscriminate copiers of De Moivre, for they appear to have imagined that he assigned $1-i\mathrm{A}$ as the present value of £1 payable at the *end* of the year of death, and they accordingly also adopted that value. There are reasons however for imagining, that in one case at least this celebrated analyst fell into no such error, but correctly assigned $1-i\mathrm{A}$ as the present value of £1 due at the *beginning* of the year of death, and bearing interest until actual payment ensued. This conclusion may be deduced from the method he has adopted in solving the following problem (XVI.), as it occurs in his *Treatise on Annuities*:—

"A borrows a certain sum of money, and gives security that it shall be repaid at his decease, with the interests. To fix the sum which is then to be paid—let the sum borrowed be s; the life of the borrower, M years' purchase; d the interest of £1: then the sum to be paid at A's decease will be

$$\frac{s}{1-d\mathrm{M}}."$$

From this it is obvious that $1-d\mathrm{M}$, or in modern notation $1-i\mathrm{A}$, was considered the present value of £1 at last of the 'interests,' or the beginning of the year of death, or of £1 at actual death of A, with such interest as might have already accrued for the current months and days. Now as half a year's interest is the most probable increment from such a source, $\frac{1-i\mathrm{A}}{1+\frac{i}{2}}$ will be the present value of £1 without interest at the instant of death, and $\frac{1-i\mathrm{A}}{1+i}$ that of £1 without interest at the end of the year of death; consequently the ratio of the latter to the former is as $1 : \frac{1+i}{1+\frac{1}{2}}$.

Mr. Sang, in his tables, does not explain by what formula he worked as to the claim at the instant of death; but if the ordinary Carlisle premiums at 3 per cent. be simply multiplied by $\frac{1+\cdot03}{1+\cdot015}=1\cdot0147$, &c., as prompted by the preceding expression, the values will be found concurrent with his own.

Some familiar correspondence which has recently taken place between Professor De Morgan and one of the Vice-Presidents of the Institute

(Mr. Hardy), at the suggestion of the former—and which correspondence the present writer has had the opportunity of seeing—illustrates the value of a reversion in so simple and explicit a manner as to have led to the preceding remarks, and title of the present paper. The Professor virtually says—Suppose £1 is producing i per annum in the 100 i per cents. for A's benefit, and at the end of the year of A's death B or his executors is to take the £1 and the interest i then due; now if A and B desire to reduce their claims upon the £1 into present values, A should clearly claim iA in place of his annual interest, and B the remainder, or $1-i$A, in place of the $1+i$ at the end of year of A's death; so that $\frac{1-i\text{A}}{1+i}$ becomes the ordinary and well known value of the reversion.*

La Place has taken a somewhat similar view (modern notation is also inserted):—

"L'analyse précédente sert pareillement à determiner la rente viagère que l'on doit faire à une établissement, pour assurer à ses héritiers un capital après sa mort. Le capital équivalant à la rente viagère $h(=1)$, faite à une personne de l'âge A, est, par ce qui précède, $h.\text{S}.\frac{p^x.y_x}{y_o}(=\text{A})$, le signe S comprenant tous les termes inclusivement depuis $x=1$ jusqu'à la limite de la vie de la personne. Nommons $hq(=\text{A})$ cette intégrale, et imaginons que l'établissement recoive de cette personne la rente $h(=1)$, et lui donne en échange le capital à intérêt perpétuel sur l'établissement lui-même; l'intérêt annuel de l'unité etant r ou $\frac{1-p}{p}(=i)$. Il est clair que l'établissement doit rendre le capital $hq(=\text{A})$, aux héritiers de la personne. Mais elle a fait pendant sa vie la rente $h(=1)$ à l'établissement, et elle en a reçu la rente $\frac{hq.(1-p)}{p}(=i\text{A})$; la rente qu'elle a faite réellement est donc

$$h\left[1-\frac{q.(1-p)}{p}\right](=1-i\text{A});$$

c'est donc ce qu'elle doit donner annuellement à l'établissement, pour assurer à ses héritiers le capital $hq(=\text{A})$."† (Vol. vii. p. 471.)

With respect then to the actual payment of claims, the simplest and most correct plan, and the one which the public would perhaps most readily understand and consider the justest, would be, to fix the premium for a sum assured, bearing interest from the date of last premium to that of the business settlement of the claim. To calculate such a rate, it is obviously only necessary to add a year's interest to the ordinary premium, for

$$\frac{1-i\text{A}}{1+i}\times(1+i)=1-i\text{A},$$

the value required for the single premium, and $\frac{1-i\text{A}}{1+\text{A}}$ for that of the annual rate.

E. J. FARREN.

* This is not unlike the view of the matter taken in a former paper in this Journal. See the note at page 162, vol. ii., where, however, a different expression is arrived at.—Ed. *A. M.*

† In France, as in England, it is customary for heirs in such cases to claim $\frac{i}{n}$A for current interest from beginning of the year of death. "Dans cette formule nous négligeons pour plus de simplicité, de tenir compte du *pro rata* d'arrérages que pourra être dû par le constituant, au moment du décès du rentier."—*Cournot*, p. 349.

FOREIGN INTELLIGENCE.

We have been favoured by our valued Correspondent, Mr. S. Groesbeeck, of Albany, with the following:—

America.—*Abstract from the Reports, for the Year* 1851, *made to the Comptroller of the State of New York by Fire Insurance Companies in that State possessing a Stock Capital.* (*The original return is in Dollars, taken as* 5 = £1.)

Names of Companies.	Capital.	Assets liable for Losses.				Total Assets.	Revenue.		Expenditures.			Other Items.		
		Real Estate.	Stocks owned by Company.	Bonds and Mortgages.	Other Property.		Premiums in 1851.	Interest and Income.	Losses Paid.	Expenses Paid.	Dividends.	Amount at Risk.	Disputed Claims.	Debts due by Company.
New York City:—	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Aetna	40,000	..	..	39,506	6,436	45,942	not stated	not stated	3,038	not stated	..	1,024,895	..	930
Astor	30,000	..	..	28,870	4,110	32,980	3,134	„	310	588	..	338,754	400	..
Bowery	60,000	..	3,667	59,441	13,792	76,920	17,167	4,951	8,309	2,369	12,000	3,035,413	..	..
Broadway	40,000	..	..	45,799	3,196	48,995	12,562	not stated	8,618	†	not stated	not stated	900	1,200
Citizens'	30,000	1,197	5,095	29,922	3,878	40,091	not stated	„	7,519	not stated	4,800	1,586,654	530	5,968
City	42,000	..	9,760	54,080	872	64,712	„	„	6,133	„	15,000	2,419,146	..	2,225
Clinton	50,000	..	5,756	46,200	2,537	54,493	3,312	1,538	not stated	1,273	..	718,291	..	..
Commercial	40,000	..	..	44,668	165	44,833	11,197	2,835	5,071	†	not stated	1,185,180	..	100
Eagle	60,000	15,105	11,000	not stated	838	not stated	not stated	not stated	8,040	not stated	8,400	2,562,438	..	400
East River	30,000	3,000	300	24,274	5,319	32,892	„	„	953	„	2,700	636,936	1,020	600
Empire City	40,000	..	..	40,800	6,473	47,273	12,919	..	6,952	†	..	1,140,000	..	337
Equitable	42,000	..	..	43,093	12,575	55,668	20,673	3,472	9,867	2,164	9,240	2,747,556	..	900
Firemen's	40,800	..	5,932	49,964	2,559	58,055	not stated	not stated	11,178	not stated	10,800	2,256,719	..	3,122
Greenwich	40,000	1,200	1,880	41,563	1,034	45,677	„	„	1,536	„	7,200	1,400,000	..	83

Grocers'	40,000	..	4,425	41,290	1,319	47,034	13,639	2,683	9,104	†	..	not stated	120	1,722
Howard	50,000	12,697	7,043	44,019	9,983	73,742	not stated	not stated	24,370	not stated	8,000	3,674,892	..	7,355
Jefferson	40,002	1,779	..	52,630	1,609	56,018	14,765	3,586	7,371	„	8,000	1,900,894	2,000	2,338
Manhattan	50,000	..	..	51,720	5,504	57,224	not stated	not stated	9,574	„	7,000	1,673,818	500	534
Merchants'	40,000	..	..	37,018	6,850	43,868	14,475	*	8,682	†	..	1,161,473	..	..
National	30,000	3,200	17	38,951	1,753	43,921	not stated	not stated	9,007	not stated	6,000	1,527,660	..	1,712
New York Fire and Marine	40,000	9,331	9,202	34,726	5,609	58,868	„	„	8,005	„	10,000	1,700,000	..	1,444
Niagara	40,000	..	..	39,339	5,983	45,322	9,778	..	2,899	†	..	not stated	200	90
North American	50,000	500	..	53,350	4,461	58,511	not stated	not stated	2,741	not stated	7,500	1,668,356	..	1,000
North River	70,000	2,460	..	75,180	6,772	84,412	„	„	9,968	„	10,500	2,244,237	652	1,189
Pacific	40,000	..	..	38,088	3,869	41,957	7,064	..	3,946	†	..	749,219	..	904
People's	30,000	..	..	25,400	7,864	33,264	7,866	..	2,939	1,997	..	not stated	..	2,404
Stuyvesant	40,000	..	..	40,188	5,486	45,674	9,654	2,643	986	2,348	..	1,186,062	..	2,210
United States	50,000	..	..	57,534	5,622	63,156	12,726	4,058	3,458	1,854	10,000	1,728,789	..	1,128
Washington	40,000	..	..	40,836	3,068	43,903	5,620	..	2,481	†	..	606,670	..	450
BROOKLYN :—														
Atlantic	30,000	..	..	29,820	3,037	32,857	7,037	..	1,089	1,776	..	744,841	..	40
Brooklyn	20,400	524	..	11,867	16,378	28,770	not stated	not stated	1,856	not stated	2,034	1,168,429	1,200	1,462
Long Island	40,000	5,169	..	33,860	16,727	55,756	„	„	6,065	„	5,600	1,714,221	1,027	239
ALBANY :—														
Albany	20,000	200	152	17,998	6,024	24,374	12,226	1,562	9,579	1,444	..	1,403,551	..	..
OSWEGO :—														
North Western	30,000	1,746	1,723	17,855	45,963	67,287	not stated	not stated	41,695	not stated	3,600	3,049,566	3,660	733

Explanation.—A dotted blank line represents "nothing," or "no property" under that head. * Included in amount of Premiums. † Included in amount of Losses.

Canada Life Assurance Company.—At the fifth annual general meeting of the shareholders of this Company, held at Hamilton, in the offices of the Company, on Tuesday, the 3rd day of August, 1852, a report was presented for the year ending the 30th of April, 1852.

The number of policies issued was 213, assuring £97,324. 17*s.* 5*d.*, and creating an additional income of £2,775. 19*s.* 9*d.*

The business actually in force at the close of the fifth year (all policies upon which renewal payments were in arrear having been cancelled) was comprised in 768 policies, assuring £326,575. 19*s.* 10*d.* upon 679 lives, and two annuity bonds, securing £162; the whole yielding an income of £9,112. 8*s.* 10*d.* from premiums alone.

The receipts of the Company during the period embraced in this report have been—

	£.	s.	d.
Premiums on 197 new policies taken up, and renewals ..	9,385	15	4
Annuities	87	6	4
Received for accumulation	159	11	11
Interest on investments	1,649	18	5
Entrance fees	26	17	6
Policy fees, fines, &c.	71	17	2
Premium of reassurance refunded	5	10	5
	£11,386	17	1
Add balance on hand, per statement on 30th April, 1851 ..	18,132	9	10
	£29,519	6	11

The expenditure for the same period has been—

	£.	s.	d.
Expense account, as per statement in detail	2,395	15	4
Reassurance	44	2	10
Claims paid (3)	2,348	5	7
Annuities (1)	62	0	0
Deposits withdrawn	92	16	3
Interest paid on deposits	162	12	7
Mutual branch profits, paid in cash or diminution of premium	117	6	9
Premiums on policies discontinued—written off	389	17	9
Entrance fee and interest refunded	0	14	1
	£5,613	11	2
Leaving a balance of	23,905	15	9
	£29,519	6	11

Distributed as follows:—

	£.	s.	d.	£.	s.	d.
Cash at bankers	2,131	17	4			
„ agencies	585	10	11			
				2,717	8	3
Investments as detailed in the abstract statement, the par value being £17,881. 1*s.* 8*d.*				15,568	7	9
Interest on the above to 30th April, 1852				248	2	0
Half yearly payments, &c. for which credit has been given, secured on the policies				4,446	16	11
Real estate				782	19	4
Office furniture				142	1	6
				£23,905	15	9

Claims during the year have resulted from the deaths of nine members, assured under ten policies, amounting to £5,623. 12*s.* In the amount of claims (£5,623. 12*s.*), but not in their number, the tabular expectation of

the year has been exceeded; nevertheless, the precautionary method adopted in former years of setting apart yearly the mathematical value of the risk run, has enabled the Company to meet these claims without in the slightest degree interfering with the profits of the year. The sum thus set apart had, on the 30th of April ultimo, reached £10,969. 4*s.* 2*d.*, while the payments for claims in the five years amounted to £4,298. 5*s.* 7*d.*, leaving a balance available of £6,670. 18*s.* 7*d.*, from which an ascertained liability of £3,275. 6*s.* 5*d.* has been since nearly discharged; the surplus of £3,395. 12*s.* 2*d.* yet remaining at the credit of this fund to aid in meeting any future excess of mortality over the tabular risk.

The result of a most careful valuation shows that the reserve, or increased value of policies in force, was £7,559. 3*s.* 5*d.*, the sum which, with the net premiums, will enable the Company to liquidate every claim upon its funds as it may be expected to mature.

The proportion of these separate funds, namely, the reserve for the increased value of the policies, £7,559. 3*s.* 5*d.*, and the reserve for risk run, £6,670. 18*s.* 7*d.*, which is chargeable against the assured in the mutual branch, is £10,856. 18*s.* 2*d.*; the amount of accumulated premiums with the due share of interest, less the proportion of expense, at the credit of the same account, is £13,064. 15*s.* 5*d.*; the difference, £2,207. 17*s.* 3*d.*, being the gross profit upon the business in this branch. From this sum the board have declared a dividend to the assured of the first four years on the mutual branch, whose policies may continue in force at this date, amounting to 15 per cent. upon the premiums received from them in the year ending the 30th April, 1851. The interest on the paid up capital, and the proportion of profit realized for the shareholders, have enabled the board to declare a dividend of 35*s.* per share, which they have again added to the paid up stock, considering the payment of a cash dividend still unadvisable; a small balance of £25. 11*s.* 2*d.* remains at their credit undivided.

The various statements required by the charter are also submitted herewith. That of assets and liabilities, showing the large surplus of £39,959. 18*s.* 8*d.* in favour of the Company, must not pass without cautionary remark. The value of the income from premiums is there necessarily calculated upon the full sum payable by the assured; but as it is optional with every member to discontinue his policy, and thus diminish the surplus, and as the future expenses of management in respect to present business have also to be provided for, this large apparent profit may be regarded as far exceeding the profit actually realized.

During the year, in connection with the Company only so far as the rates are concerned, a Society has been formed for the purpose of bringing life assurance more immediately under the notice of the working classes, and of extending its practice by the single payment system. With this object in view, the Hamilton Life Assurance Savings' Fund Society was established, on principles somewhat similar to those which govern the operations of Building Societies, a policy of assurance being the security which the Society retains for the money advanced, in place of a mortgage on property. To the 30th April ultimo, the sum of £75 had been advanced to the Life Assurance Company by this Society, in the purchase of policies of assurance on the lives of three of its members; and for each 100 shares subscribed in this or any other similar Society, one policy per month can be secured.

The board of directors have also, with a view of encouraging the practice of life assurance among all classes of society, sanctioned the issue of policies as low in amount as £25, on the scale of non-participation; their limit on the other extreme remaining at £1,500 on a single life. They, however, have in contemplation an increase of that limit to £2,000—the present position of the Company, its revenue and invested means, and the number of its assured members, fully warranting them in making such an extension. During the past year a few proposals for assurance have been accepted, exceeding in amount £1,500, and the excess has been written off in another Company.

In annuities the business of the Company had not augmented to the 30th April. This branch of the Company's business cannot be expected to increase very rapidly, as the rates offered are necessarily at the younger ages but little above the rates at present attainable on investments, the Company being compelled, in calculating them, to protect itself from the disastrous results of basing long pending contracts upon a temporary or uncertain rate of interest. It is the intention of the board, however, to bring a system of deferred annuities before the public, which, while answering many of the purposes of Benefit Societies, will, from its mathematical foundation, offer the utmost security, and thus prove of more lasting benefit to the classes of which those Societies are composed.

The board of directors have not deemed it conducive to the welfare of the Company to increase its operations by issuing policies on the lives of parties *en route* to California, although solicitations to do so have been numerous; for they feel, that while so much uncertainty exists in regard to the value of life there, it would be imprudent to extend its business in that direction. Neither do the board wish to encourage the issue of policies on the lives of parties going to the gold regions of Australia—the unsettled state of society there, and other circumstances, rendering, in their opinion, such risks at present undesirable. Such, however, of the assured as purpose to remove to Australia can do so on payment of a small extra fee for the voyage.

The thanks of the shareholders were voted to the president and directors, for their unwearied attention and zeal in promoting the interests of the Company; and the sum of £260 was placed at the disposal of the directors, to remunerate them in a slight degree for the attention it is assumed they will continue to give to the interests of the shareholders and the assured.

General Abstract.

Liabilities.	£.	s.	d.
To 6½ per cent. paid on capital stock of £50,000	3,250	0	0
To balance of moneys lodged for accumulation, with interest to 30th April, 1852	3,105	14	11
To claims matured in course of settlement	3,275	6	5
To present value of capital sums assured under 746 policies for life, including vested additions, say £321,523. 19*s*. 10*d*.	81,035	14	5
To present value of capital sums assured under 22 policies for a limited period, say £5,052	845	5	3
To present value of one life annuity £62 / To present value of one deferred do. £100	1,476	14	0
	£92,988	15	0
To balance, being surplus	39,959	18	8
	£132,948	13	8

Assets.		£.	s.	d.
By cash at bankers	£2,131 17 4	2,717	8	3
By cash in agents' hands	£585 10 11			
By Bank stock, at par value		210	0	0
By mortgages on real estate, par value		2,445	1	6
By Municipal Corporation debentures, do. do.		14,725	10	2
By Provincial Government debenture		25	0	0
By terminable annuity, secured on real estate, present value		322	1	5
By bills receivable		153	8	7
By interest to 30th April, 1852, on above securities		248	2	0
By half yearly, &c. premiums credited and secured on policies		4,446	16	11
By leasehold property, Company's offices		782	19	4
By office furniture		142	1	6
By present value of income of £8,801. 14*s.* 8*d.* from life premiums		104,215	10	10
By present value of income of £310. 14*s.* 2*d.* from life premiums, for a limited period		2,514	13	2
		£132,948	13	8

Statistics of the Assured.

Whole sum assured, £326,575. 19*s.* 10*d.*

Number of policies in force, 768. Number of lives assured, 679.

Income from premium, £9,112. 8*s.* 10*d.*—Average risk, nearly £481.—One deferred annuity, £100.—One life annuity, £62.

Amount of Risks.—10 under £100; 85 of £100; 223 over £100 and under £500; 238 over £500 and under £1000; 94 of £1000; 29 over £1000.

Professions and Occupations.

Architects and civil engineers	8	Military men	10
Bank agents	8	Married females	27
Barristers, attorneys, and advocates	58	Presidents public companies	2
Clerks in banks, &c.	78	Physicians and surgeons	19
Clerks in Government employ	13	Postmasters	5
Clerks in public offices	24	Secretaries public companies	7
Clergymen of various denominations	28	Sheriffs	3
Editors	3	Students	9
Farmers	22	Schoolmasters	9
Forwarders	3	Other occupations	10
Horticulturists	1	Widows	12
Judges, superior and county courts	6	Gentlemen	19
Land and general agents	12	Labourers and servants	6
Mechanics and tradesmen	118	Spinsters	2
Merchants and store keepers	145	Ship owners and builders	8
Master mariners	4		
			679

Places of Birth.

England	201	Nova Scotia and New Brunswick	2
Canada	171	East Indies	2
Scotland	148	Portugal	1
Ireland	86	Duchy of Holstein	1
U. S. of America	48	Denmark	1
West Indies	6	Cephalonia	1
Guernsey and Jersey	3	Gibraltar	2
France	3		
Wales	3		679

Ages of Assured.

Of 20 and under	13	From 41 to 45	107
From 21 to 25	49	From 46 to 50	52
From 26 to 30	116	Of 51 and upwards	56
From 31 to 35	148		
From 36 to 40	138		679

GERMANY.—*Summary of the Operations of the German Assurance Companies for the Year* 1851—(*continued from page* 164).

B. LIFE ASSURANCE COMPANIES.

Name of Company.	New Business.		Total written off.		Existing at the close of the Year.		Total Capital.		Expenditure. This Year.	Share Capital and Assurance Fund.
	Number of Persons.	Sums assured.	Number of Persons.	Sums assured.	Number of Persons.	Sums assured.	Of last Year.	This Year.		
		£.		£.		£.	£.	£.	£.	£.
Leipzig	212	29,857	157	29,157	4,479	741,200	160,121	33,646	21,044	172,723
Lubeck [a]	Unknown	20,797	Unknown	44,331	Unknown	444,407	126,001	19,810	14,114	131,695
Berlin	Do.	Unknown	153	24,214	6,984	1,163,714	345,906	58,717	[b]41,005	363,618
Frankfort-on-Maine	196	43,860	11	1,822	709	139,340	25,128	6,462	5,971	[c]27,001
Janus in Hamburg	879	84,709	268	30,952	2,561	316,108	6,228	11,792	7,877	10,143[d]
Assicurazioni Generali in Trieste	Unknown	Unknown	Unknown	Unknown	Unknown	475,057	48,975	37,372	16,180	68,463[e]
Hanover	132	10,200	103	7,786	2,919	240,014	Losses paid	up yearly	5,873	34,453
Gotha	773	171,157	489	117,243	16,855	3,814,614	859,565	171,878	109,269	922,174[f]

[a] Exclusive of endowments, life annuities, and survivorship assurances, as also Frankfort, Hamburg, and Trieste.
[b] Including £10,024 dividends.
[c] Exclusive of a share capital of £250,000.
[d] Exclusive of a share capital of £75,000.
[e] Exclusive of share capital.
[f] Clear profit of £46,818, or 35 per cent. dividend.

C. Life Annuity Companies.

Name of Company.	Number of Members.			Total of Annuity Capital.
	Full Term.	Shorter Periods.	Together.	
				£.
Berlin.....	31,692	150,107	181,799	859,145
Dresden	3,339	4,809	8,148	62,113
Hanover....	2,112	4,455	6,567	49,002

The other Companies in Darmstadt, Carlsruhe, Vienna, and Munich have not yet sent in their accounts.

D. Hail Assurance Companies.

a. Companies in which the Premium is paid beforehand.

Name of Company.	Sums assured.	Premiums received.	Total Receipts.	Losses and Contributions.	Total Expenditure.	Proportion of Loss paid.	Reserve Fund.	
	£.	£.	£.	£.	£.		£.	
Berlin	2,709,714	Unknown	Unknown	10,273	Unknown	Full	None	Proprietary
Leipzig.....	1,510,408	12,561	15,931	14,981	15,931	Do.	4,185	Mutual
Erfurt	1,655,181	18,311	19,963	16,127	19,963	Do.	432	Do.
Weimar	174,357	1,421	1,625	651	1,154	Do.	677	Do. (with Capital)
Berlin and Cologne ..	228,950	1,617	2,050	1,702	1,702	Do.	348	Do.
Trieste	133,965	1,705	Unknown	1,880	Unknown	27·65 per ct.	None	Do.
Clausenburg	33,413	720	720	510	510	Full	68	Do.
Bautzen	72,880	577	*1,801	1,799	1,799	Do.	21	Do.

* Including additional premiums paid up, £1,154.

b. Agricultural Companies paying up for Losses which occur.

Name of Company.	Sums assured.	Losses and Contributions.	Contribution per cent.	Reserve Fund.
	£.	£.		£.
Hanover	714,659	5,900	·847	298
Marienwerder..	89,864	679	·733	Unknown
Brandenburg ..	65,332	537	·822	Do.
Neubrandenburg	1,644,430	11,493	·688	Do.
Schwedt	117,150	15,150	1·233	Do.

Masius—*Versicherungs Zeitung.*

Berlin.—Proposition of Law for the Prussian Chambers, concerning the Regulation of Assurance Companies.—The Minister of Trade has brought forward the following project of law for discussion. It is here produced in the form in which it has been introduced.

"We Frederick William, by the Grace of God King of Prussia, &c., hereby commission our Minister for Trade, Manufactures, and Public Works, to lay before the Chambers for constitutional discussion the following project of law for the regulation of Assurance Companies.

"Given at Berlin this 2nd February, 1853.

(Signed) "FREDERICK WILLIAM.
(Countersigned) "V. D. HEYDT."

Project.

"Law concerning the Regulation of Assurance Companies.

"Sect. I. The directions of § 340, R. 6, of the Penal Law of 14th April, 1851, applies to the projectors of Assurance Companies of every kind, as well as to those who carry on the business of Companies established before the 1st July, 1851, but which have not yet received the proper assent. The assent of the legal authorities therein required is to be obtained from the district authorities where the projectors reside, and can only be granted when the authorities are satisfied of the respectability and responsible character of the projectors.

"Sect. II. Foreign projectors of Assurance Companies (§ 1) must, if they wish to appoint agents in the country (§ 3), obtain the permission of the Ministers, unless they have the special agreement of the State to the contrary. (§ 18. *Allg. Gew. Ord.*, 17 Jan., 1845.)

"Sect. III. Whoever wishes to negotiate assurances (as agent) for an Assurance Company (§ 1 and 2), must obtain the permission of the local authorities where he desires to carry on the business. The permission will only be granted when the authorities are satisfied of the respectability and responsibility of the applicant.

"Sect. IV. To foreigners who apply for this permission, the regulation in § 2 also applies.

"Sect. V. The general legal regulations as to the withdrawal of a permission, and the proceedings to be taken thereon (*Allg. Gew. Ord.*, § 71 to 74), apply also to the licenses obtained under § 1 and 3. The permission granted to foreigners (§ 2 and 4) may be revoked at any time, without giving the grounds thereof.

"Sect. VI. The regulations of § 3 and 5 apply also to sub-agents, with the consideration that the permission granted expires whenever the party whom they represent (the agent) loses the permission. A similar rule applies to all agents and sub-agents of the Companies from which the permission is withdrawn under § 1, 2, and 5.

"Agents and sub-agents, before obtaining a license, must show that the parties whom they represent are duly authorized.

"Sect. VII. Whosoever undertakes or negotiates assurance business by way of business or for profit, for projectors of Assurance Companies not properly authorized, or for projectors properly authorized, but not having permission for himself or through another, or who tenders his services for undertaking such business, or gives information about it, is liable to a fine of 200 thalers (£29) or to imprisonment for three months.

"Sect. VIII. Whoever has obtained a license as agent or sub-agent of an Assurance Company previous to the passing of this law, under § 49 of the General Trade Ordinances, must obtain a new license, so far as the projectors of the Company are required, to be authorized under the regulations of § 1 and 2.

"Sect. IX. The Assurance Companies established, or to be established, as Proprietary Companies in the country, are subject to the foregoing regulations (§ 1 to 8), with the proviso that, as concerns the granting and withdrawal of the license mentioned in § 1, it depends upon the regulations already existing in the law of 9 Nov., 1843. (*Gesetz Sammlung*, 1843, s. 341.)

"Sect. X. With respect to the fire insurances of moveable property, it depends on the regulations of the law of 8th May, 1837. (*Gesetz Sammlung*, 1837, s. 102.)

"Attested by the Minister of Trade, Manufactures, and Public Works.

(Signed) "V. D. HEYDT."

Trieste.—Report of the Imp. Reg. priv. Riunione Adriatica di Sicurtà in Trieste, for the year ending 30*th June*, 1852.—It is stated that the report for this the fourteenth year of the Company's operations has been delayed by circumstances beyond control, but the directors are happy to state that the results are not less favourable than in preceding years. The sums assured amount to £35,000,000, and the corresponding premiums to £170,000, being about 20 per cent. more than during the preceding year. The losses had been £89,000, but, in consequence of the amount received from reinsurances, were reduced to £70,000 paid by the Company. The business of the Company has resulted in a realized profit of £9,000 independent of the interest on the reserved fund, which, according to the statutes of the Company, is now divisible amongst the shareholders. This profit is the more satisfactory, as it is ascertained after making a further addition to the reserve fund, which now amounts to £130,989, and after increasing the reserve of profits to £24,187; making together £155,176.

The circular convening the meeting had announced the intention of the directors to propose the formation of two new branches of business. The idea of undertaking the *assurance of human life* had been a long time under consideration; but they had been unwilling to enter upon it until they had collected all the data and information necessary to carry on this scientific branch of the business with security to the Company, and with advantage to those who entrusted the interests of themselves and their families to their hands. These preliminary investigations are almost complete, and in a short time they will be prepared to commence the plan, if the shareholders sanction the proposition. The assurance of human life has hitherto received but little attention in the Austrian empire; but the benefits which it offers are likely to lead to the same development of the business which has elsewhere encouraged the various Companies which have tried it. It would seem to be against the laws of nature that an institution should remain unknown and unvalued, which is calculated more than any other to secure the welfare of families, to provide comfort in old age, to promote education, to increase the returns of alienable capital, and facilitate a variety of contracts which would otherwise be impossible. Without alluding to England, where such transactions are on a truly colossal

scale, we see the system flourishing in many other countries of Europe and America; and this in time will surely be the case in our own, because the advantages attendant thereon are clear and demonstrable, and the contracts equitable, clear, and adapted to all the wants of society and commerce. The Riunione may therefore undertake the assurance of sums payable in case of death, as well as sums or annuities payable in or during life, and any other contracts dependent on the chances of human life; and in certain cases agree to allow the assured to participate in the profits of the Company at fixed intervals of years.

The other branch of assurance which it is proposed to introduce is *assurance against the risks of hail*, for which many requests have been made from the various agents, as greatly needed by their clients and likely to lead to an extension of the fire business. After much consideration, the directors are convinced that this branch of assurance may not only be less hazardous than at first sight it appears, but, if undertaken with caution and restricted to certain places, may produce the same profitable results which some other Companies have experienced. With the increase of the business in different places not only will experience and new information be acquired, but the means of avoiding the too large accumulation of risks in one particular district—one of the greatest dangers to which this class of assurances is exposed.

For these propositions* the sanction of a general meeting is required by the statutes, in which authority is given to the Company to carry on any branch of assurance not prohibited by the laws.

Balance Sheet for the Year ending 30th June, 1852.

		£
Premiums brought forward from the last balance for assurances in force		105,585
Reserve for losses not settled		2,400
Premiums received on the total amount assured against fire and other elements, £34,859,514		169,596
Profit on the funds		3,397
		280,978
Premiums on assurances still in force, clear of charges, reassurances, and other payments		130,989
Remaining		149,989
From this deduct further—		
Total amount of 2,497 losses which have fallen on the Company (less salvage)	£ 88,890	
Less proportion borne by reassurances	19,202	
	69,688	
Estimated amount of losses in the year, not yet settled	6,100	
Reassurance premiums on £5,910,351	25,018	
Discount, bonuses, and brokerage, and returns on £1,176,856	9,245	
Commission to agents on premiums received by them	17,088	
Salaries, rent, postage, printing, travelling expenses	8,227	
Interest belonging to shares, with 30 per cent. deposit	64	
Interest to shareholders on the reserved fund	841	
		136,271
Gross surplus		13,718

* We understand that both these propositions were carried unanimously.—Ed. *A. M.*

		£
Gross surplus brought forward		13,718
From which deduct—		
20 per cent. carried to reserve fund	2,744	
Remuneration to directors	1,920	
		4,664
Leaving a net profit of		9,054

Which, apportioned amongst 1,979 shares participating, affords a dividend of £4. 11*s.* 6*d.* per share.

	£
Reserve fund, by last account	21,342
Profit on shares forfeited or reduced . .	101
Reserve from present profits	2,744
Total reserve fund, 30th June, 1852 . .	24,187

The following reports from Switzerland we owe to the courtesy and attention of M. Kœnig,* of Berne:—

SWITZERLAND.—*Berne.—Caisse Nationale Suisse de Prévoyance.*—Report for the year 1851, at the 10th ordinary general meeting, 31st May, 1852.

Total amount of subscriptions	£480,000
Guarantee fund	6,000
Reserve fund	2,400

M. Belrichard, President of the Cour d'Appel du Canton de Berne, opened the sitting as President of the Board, and gave a sketch of the progress of the Society during the year 1851, in which their operations had been extended to Baden, Wurtemburg, and Bavaria, as well as to the whole of Switzerland. He mentioned, that since the establishment of the Society no loss whatever had occurred in laying out the capital, and that notwithstanding the amount to be invested has rapidly increased every year, and especially in the early months, the directors have, by their care in watching for opportunities, prevented the loss of interest which might arise from delay in investment. Various reports were then read from members appointed to examine the accounts and securities of the Society, and the general report was then read. After alluding to the small resources with which the Society commenced, and the competition with which it had to contend from foreign Societies, it was shown how complete success had attended the energy, perseverance, and prudence with which their affairs had been conducted. The classes of annuities, the capital of which is to be divided in 1854, consist of many thousands of members; and from that time the numbers continually increase to 1862, when the Society will terminate, none being allowed to last more than 20 years. The balances show that the subscriptions, on 31st December, 1850, were £273,006, and that in 1851 they were less by £19,652. This reduction arises principally from the monetary changes effected at different times, and on such conditions in the Eastern Cantons that the directors were obliged to suspend operations by travelling agents, on account of the losses that would have accrued from the receipt of German money, and the relative values of the investment of it at Berne; but at the same time they anticipate much

* Since receiving these reports, we regret to have to announce the death of this gentleman, one of the distinguished foreign correspondents of the Institute of Actuaries, and who had promised us much information on the progress of assurance in Switzerland.

benefit from the changes, and that this monetary reform will facilitate the commercial relations between the different Cantons.

Very satisfactory results have followed the employment of travelling agents. Thus it is stated that five travelling agents have received £37,639

Subscriptions paid direct to the Society	1,370
Twenty-eight stationary agents in different places	4,359
Total	£43,368

and the directors accordingly propose to extend the system by appointing an additional number of this class of agents.

The Balance on 31*st December*, 1851, *shows due*—

Dr.		£.
1. To subscribing members		79,019
2. To holders of life annuities		2,209
3. To shareholders for their guarantee fund	£4,000	
Ditto ditto reserve fund	1,008	
Profit and loss account	995	
		6,003
4. To different creditors		5,571
		£92,802

Cr.		
By 199 mortgage securities	£73,376	
By 262 State Bonds of Canton of Berne	5,240	
By drafts and bills	4,689	
By Cantonal Bank of Berne	628	
By cash	604	
By interest account	2,514	
By various debtors	5,751	
		£92,802

The general statement of the subscriptions in each month amounts to £240,429, and the total credited thereto being of the same amount, the operations for the year have increased to upwards of £480,000, whilst in 1850 they were only £400,000.

At a special general meeting of the shareholders, held 31st May, 1852, M. Cunier, the manager, laid before the meeting the plan of some new branches of assurance which it was proposed to establish, and it was agreed to consider the formation of a totally new Society, without any guarantee or responsibility from the old, but to work with the same interest, if it could be done without injury to the existing Society. This project was referred to the council and committee of management, to report to the shareholders at a special meeting.

MISCELLANEA.

A short Account of the Early Bills of Mortality in Dublin. By W. R. Wilde, Esq., Assistant Census Commissioner. [*Read before the Statistical Section of the British Association at Belfast, 7th September*, 1852.]—We learn from the writings of Graunt and Short that bills of mortality were first kept in London at the time of the first plague in 1592-3 and 4, and after some interruptions were resumed under the name of "The Continued Weekly Bills of Mortality," at the time of the great plague in 1603. By means of the present admirable registration of births, marriages, and deaths in England, these docu-

ments, improved by modern science, may be said to descend to the present time. The information regarding the deaths specified in these early bills was procured by persons called searchers, and arranged, printed, and distributed for weekly, quarterly, and yearly periods by the Company of Parish Clerks of London, at whose hall they were supposed to remain; but, like many early newspapers, it is now very difficult to procure a complete set. I happen, however, to possess "A General Bill of all the Christenings and Burials from the 14th of December, 1686, to the 13th of December, 1687, according to the report made to the King's Most Excellent Majesty," which may be interesting to the members, as showing the mode in which these broadsides were printed.

As several works have either been written specially on the subject or allude to these bills at considerable length, it is unnecessary to occupy time in discussing their merits.

That bills of mortality were kept for the city of Dublin for a great number of years, the members of the medical profession, and also persons versed in the literature of this country, are well aware, from the writings of the laborious and painstaking Dr. Rutty, who in his "Chronological History of the Weather and Seasons, and the prevailing Diseases in Dublin," during the space of forty years, availed himself largely of these bills, from 1725 to 1766. And in his Essay towards a Natural History of the County of Dublin, published in 1772, he has left us a short tract, entitled "Observations on the Bills of Mortality in Dublin," wherein their results are discussed, and a comparison made between the bills of London and Dublin; but there is no notice taken of the time they were commenced, the mode in which they were procured, nor the period at which they ceased. Rutty died in 1775, and I have not seen any bill later than that date.

When preparing the report upon the tables of deaths, and drawing up the statistical nosology attached to the Irish census of 1841, my attention was naturally directed to the subject; but I was then unable to procure, either in the public libraries or in private collections, any of the original bills. In Sir William Petty's rare tract of "Observations upon the Dublin Bills of Mortality, 1681, and the State of that City," which was published in London in 1683, I found a small weekly bill of the "Burials and Births of 1666," together with some forms marked A, B, and C, for the purpose of effecting a more useful and complete registry of the deaths and casualties of Dublin at that period. In 1686 Petty reprinted this tract under the title of "Further Observations upon the Dublin Bills, or Accounts of the Houses, Hearths, Baptisms, and Burials of the City." To this he has added a bill of mortality for 1682. Two years afterwards the same distinguished author brought the subject of the Dublin bills under the notice of the Royal Society, a paper on which will be found in the Philosophical Transactions of that year. Thus far, Sir William Petty and Dr. Rutty.

Graunt first drew attention in England to the value of statistical inquiries of this nature, in his "Natural and Political Observations upon Bills of Mortality," in 1661; and that is the date which I am inclined to assign to the first Dublin bills, which it is not improbable were undertaken after the publication of his valuable work. In the early editions I do not find any notice of the Dublin bills; but in the Appendix to the fifth edition of his "Observations on the London Bills of Mortality," published in 1676, we find a small imperfect bill, headed thus:—"Dublin—A Bill of Mortality from the 7-6 of July to the end of August, 1662." This is the earliest date that I have been able to assign with any degree of certainty as the first registration of deaths in Ireland, though I am inclined to think it was commenced the year before. The entries in these early bills are interesting, as showing the particular diseases which at that time prevailed in Dublin; and they were formerly of some use to me in arranging the synonymes, popular and provincial terms, used in the Census nosology.

Dr. Thomas Short, who wrote his "Observations on the City, Town, and Country Bills of Mortality," in 1750, thus alludes to the tract of Sir William Petty, to which I have already referred:—"Major Graunt having taken no

notice of the Dublin bills of mortality, though the second city in his Majesty's dominions, an ingenious author in 1681 has published a small schedule on them, with three short tables." Consequently this bill for 1662 must have escaped the notice of Short; perhaps he only consulted the early editions of Graunt's work. "After this," says Short, "I meet with no other public account or notice of the Dublin bills till 1747, but the worthy Dr. Rutter there procured me an annual abstract of them from 1715 to 1746—only the births and burials of 1739 are wanting, because before that year they ended their year with March 24th, but since then with December 25th."

In the newspapers of the period will be found the total births and deaths, extracted from the weekly and quarterly bills; but the items are not given.

Among the papers of Archbishop King, lately procured by Mr. Daly, a bookseller in Dublin, and sold by him to the library of the University, was found a manuscript of Doctor Willoughby's, which is now in my possession. This is entitled (but in a different hand from the manuscript itself) "Observations on the Bills of Mortality, and Increase of People in Dublin; the Distempers, Air, and Climate of this Kingdom; also of Medicines, Surgeons, Physicians, and Apothecaries. By Dr. Willoughby, an eminent Physician in 1690. Sent to the Right Rev. Dr. William King, Bishop of Derry, whose remarks thereon are annexed, in a letter to the author, 20th May, 1691." The letter, however, is not forthcoming, but it may possibly turn up in some of the manuscripts of the bishop hereafter. As it is my intention to publish this manuscript in full, I shall merely refer to that portion of it which relates to the bills of mortality, first premising that Dr. Charles Willoughby was, I believe, an Englishman, who settled in Dublin some time between 1670 and 1680. He was the *arbiter conventionis* of the Dublin Philosophical Society, established by William Molyneux in 1683, and was afterwards director of that body when Petty became president. He wrote some valuable papers on medical subjects, and on the lines of latitude and longitude, and is named in the charter granted to the College of Physicians by William and Mary. He died in September, 1694. There is a manuscript letter of his to St. George Ashe, written in 1685, preserved in the collection of the Royal Society of London; but it does not refer to this subject. He seems to have been a very learned and ingenious man, but was evidently unaware of the time when the Dublin bills were first commenced; for in the manuscript referred to he says, "The bills of mortality have not been kept in Dublin much above ten years. I have been constantly served with them for these eight years, and thought I had a sufficient stock to make some observations upon; but when I came to review my collection, I found it very imperfect, partly by neglect of servants whom I entrusted to put them on the file, and partly through my own frequent absence from home; soe that I was not able to make up all the yearly bills, and was feign to be content with those I have entered, not knowing where to supply my want of them in all Dublin." The subsequent portion of this manuscript discusses the question of the average yearly mortality, as well as the various diseases specified in the bills.

The Dublin bills were prepared and distributed for a small weekly allowance by a Government registrar (whose name is attached to each, at least of the later ones); for under the head of Concordatum we find payments made by the Treasury Office, Dublin, for two years, from Lady-day, 1755, to 1757; thus—"July 7, paid Arthur Cowan, Registrar of the Bills of Mortality, for two years' allowance, to the 30th May, 1755, £6. 17*s*. 7½*d*." In the Commons' Journal of 1763 will be found a similar item to the same person for a like sum.

In the Dublin Library there is a small quarto volume of Weekly Bills of Mortality for 1752-3; and Charles Haliday, Esq., of this city, is also, I believe, in possession of several of these curious documents. These Dublin bills are defective in not including the births or deaths of either Protestants or Roman Catholic Dissenters, and from not including the deaths of such as were buried in the suburban graveyards.

During the last few years I have become possessed of six Dublin bills of mortality. One of these I found pasted into the back of an old book, and five were given me by Professor Croker King, of Galway, who found them among

some papers of his uncle, a distinguished surgeon, whose name he bears. The dates of these are, "A Yearly Bill of Mortality for the City and Suburbs of Dublin, ending the One-and-twentieth of March, 1683." This is the earliest original bill which I have seen; it contains the baptisms and burials of the different parishes—the former amounting to 1045, and the latter to 2154. It does not, however, contain any record of the deaths and burials of the parish of St. Anne, nor of George's, Luke's, Mary's, Mark's, Paul's, or Thomas's, which are all specified in some of the subsequent bills, neither does it contain any record of the French burials in the three graveyards belonging to that congregation; but under the head of diseases and casualties we find the item "Quakers," of whom seven deaths are recorded. Sixty-one causes of death, including that of Quakers, are specified in this bill. At foot we find a comparison of the yearly, quarterly, and weekly baptisms and burials (in which the sexes, and in some cases the ages, are given) since the publication of the previous bill, and the sheet concludes with "The Assize of Bread, by order of the Lord Mayor.". An examination of the diseases and casualties specified in this bill affords matter for reflection upon the state of disease, the condition of medical knowledge, and the moral and social position, of the people of Dublin at that time.

The next bill in this collection is a yearly one, ending the 28th December, 1760; it is of a much larger size than the preceding. It contains the baptisms and burials of all the parishes omitted in that for 1683, and which probably became added to the city during the previous 57 years. In the section for the parishes we find a record of 9 births and 40 burials among the French, and in the bill for 1766, which I also possess, we have an account of 10 baptisms and 52 burials of persons of that nation, at which period it is probable that the French Heugonot population was largest. In this bill for 1760, as well as in all the subsequent bills which I have seen, the items for disease and casualty are much less, seldom exceeding 40; and the portion devoted to the assize of bread is increased, and likewise contains the fixed price of meal, wheat, oats, &c., and also several extracts from Acts of Parliament relating to "bakers, butchers, ingrossers, forestallers, regrators, or others." At foot of this and all the subsequent bills we read, "Post this for the use of your family." The burials that year amounted to 1993, and the baptisms to 1715.

In 1766, for which I possess the yearly bill, and which is very similar to the former, the baptisms were 2,279, and the burials 2,407. From these two latter bills we perceive that the burials exceeded the baptisms considerably, at least of the Protestant portion of the population. But the city appears to have been visited by one of those outbursts of fever, with which we are all familiar; for in the former year, 1760, we find a return of 878 from fever, and in 1766 no less than 1,374 deaths are set down to fever, and 14 to spotted fever, or more than three-fifths of the whole. These years were likewise marked by a severe epidemic of small pox.

The next bill in chronological order in my collection is a quarterly, for the period ending 27th of September, 1767. After that I possess a yearly bill, ending the 27th of December, 1767, which shows a slight alteration in the day of the month on which the bill was published. The baptisms this year are 2,120, and the burials 2,211. Both fever and small pox were high this year also.

The sixth bill which I possess is a quarterly, ending the 26th day of June, 1768.

I have brought these remarks before the section more for the purpose of eliciting than affording information; but in the absence of a general registration of deaths, births, and marriages in Ireland, an absence so much felt by all classes of the community, I thought that this brief notice of what was doing in connection with sanitary matters in Dublin nearly two hundred years ago would be interesting; and I hope that this communication may be the means of bringing to light any other Dublin bills of mortality which may exist in the collections of the curious.

METROPOLIS.—*Table showing the Mortality for the Year* 1852, *and in each Week of the Districts in which the Deaths occurred, the Temperature and Meteorology*

[Extracted by permission from No. 13

DATE. Weeks ending	ZYMOTIC DISEASES.	SPORADIC DISEASES. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	BIRTHS. Males.	Females.	DEATHS. Males.	Females.
1852.																					
JAN. 3	234	47	192	144	69	253	58	12	7	10	4	4	45	22	55	27	111	905	869	692	609
" 10	228	45	163	131	45	249	73	18	12	10	5	8	27	17	53	2	22	808	734	593	518
" 17	207	45	187	117	60	218	63	10	11	10	2	2	42	21	60	2	30	762	727	540	556
" 24	220	42	171	127	37	198	64	16	7	8	5	6	23	32	56	8	41	788	810	528	533
" 31	215	39	189	105	35	176	71	12	10	7	5	5	24	31	46	3	16	822	794	501	501
FEB. 7	201	40	206	117	46	171	53	14	8	6	2	5	33	15	42	13	30	860	806	497	518
" 14	191	36	180	124	44	185	51	8	4	7	2	5	32	19	43	7	29	803	798	492	478
" 21	192	56	213	120	54	203	50	14	7	10	2	1	23	19	55	11	41	765	824	544	528
" 28	208	47	206	121	53	193	60	15	10	4	2	3	23	19	51	14	37	831	807	544	525
MARCH 6	207	54	196	127	49	231	61	20	11	10	3	2	35	23	40	10	31	873	826	566	562
" 13	197	63	237	129	59	251	61	14	5	6	1	2	26	21	58	14	83	841	806	636	595
" 20	198	44	224	145	51	269	74	22	5	14	1	4	30	31	62	1	31	897	813	652	556
" 27	204	47	224	118	53	243	80	19	15	8	6	3	28	30	55	15	62	814	793	615	604
APRIL 3	213	67	219	129	65	249	56	15	11	11	4	3	32	29	61	42	112	838	892	668	656
" 10	221	45	207	97	33	235	48	17	7	3	3	6	30	24	52	3	16	737	723	537	514
" 17	232	48	198	108	43	214	55	17	12	11	2	4	41	17	46	3	34	805	839	551	541
" 24	204	44	199	128	33	172	54	17	8	16	4	4	28	21	56	6	20	789	819	559	462
MAY 1	232	44	197	105	37	187	55	7	9	9	5	1	34	25	42	9	24	806	730	524	502
" 8	193	48	190	108	37	166	60	18	17	9	2	3	26	27	32	9	14	810	850	498	474
" 15	234	46	200	121	45	169	74	8	11	6	2	1	33	30	46	3	34	712	689	529	541
" 22	228	39	189	120	33	131	59	8	7	..	1	2	29	22	44	5	21	711	749	449	494
" 29	205	44	177	104	40	115	50	11	9	10	..	3	30	20	41	5	15	776	640	477	496
JUNE 5	246	45	195	106	41	126	76	9	9	6	2	4	22	27	38	3	40	814	742	525	475
" 12	209	44	181	110	35	110	56	9	7	9	3	3	23	23	41	6	24	692	622	448	448
" 19	196	41	189	110	37	104	65	20	12	6	..	5	23	15	43	7	25	774	812	455	449
" 26	215	48	204	115	41	110	55	15	13	9	2	2	30	25	31	6	64	818	736	490	500
JULY 3	187	51	183	131	44	91	59	12	12	17	6	5	17	10	44	20	95	789	724	516	473
" 10	215	49	221	131	49	122	74	11	11	4	2	5	24	27	61	2	42	676	638	555	535
" 17	213	39	192	126	31	98	47	9	8	10	2	5	34	26	38	3	24	781	657	481	440
" 24	264	40	182	110	28	64	69	7	6	10	1	3	33	27	34	2	26	795	773	458	454
" 31	308	38	211	112	33	68	71	14	7	10	..	7	48	35	35	1	40	761	669	532	509
AUGUST 7	379	36	205	116	34	70	76	10	13	7	1	3	42	43	41	6	35	751	713	597	527
" 14	385	50	191	111	36	76	79	5	7	8	1	2	24	38	34	6	31	771	694	536	555
" 21	373	41	212	92	43	75	67	11	8	6	..	1	41	31	38	3	36	850	789	581	503
" 28	310	43	155	119	30	77	75	12	5	9	..	1	42	34	27	1	32	753	746	508	473
SEPT. 4	282	43	169	112	31	73	63	5	3	9	2	5	32	38	34	5	56	785	739	489	477
" 11	258	44	180	90	40	102	53	7	8	7	4	1	26	32	30	7	44	749	688	491	449
" 18	278	39	162	74	22	103	59	6	10	8	3	5	21	33	56	4	21	718	720	470	443
" 25	271	42	200	99	43	129	54	15	10	14	4	5	31	34	38	11	74	847	793	589	488
OCT. 2	262	51	194	133	51	151	70	9	11	5	2	6	33	41	42	46	137	807	797	697	554
" 9	216	49	168	127	32	144	71	13	7	6	2	3	26	35	48	4	31	697	653	496	488
" 16	254	42	182	105	44	195	59	17	7	7	2	7	28	29	52	12	34	782	825	542	551
" 23	251	45	162	110	47	209	56	19	5	7	5	8	28	24	46	14	33	796	771	530	542
" 30	230	49	168	118	33	262	58	14	9	12	3	7	32	21	45	2	24	686	714	562	528
NOV. 6	224	55	184	107	37	234	54	12	13	6	3	1	32	29	45	2	37	830	814	578	523
" 13	228	27	167	98	28	192	67	15	12	11	5	3	32	21	42	9	26	691	759	516	506
" 20	184	32	181	104	42	167	55	11	10	9	2	5	29	24	43	3	20	770	720	487	435
" 27	207	45	161	96	30	172	79	13	7	12	..	2	24	20	32	4	40	855	816	472	475
DEC. 4	210	51	170	134	46	171	68	12	12	11	3	5	31	20	38	4	52	851	788	537	505
" 11	212	70	154	131	43	171	55	8	5	6	1	6	35	26	45	7	30	810	769	522	490
" 18	211	47	183	118	43	161	46	11	9	9	3	4	30	15	44	9	79	878	784	555	486
" 25	162	35	145	111	41	130	69	14	14	11	3	1	25	18	34	10	33	708	643	445	426
Total for 1852..	12104	2361	9815	6001	2156	8435	3235	657	463	446	130	197	1572	1336	2315	431	2139	41038	39446	27852	2635
Total for 1851..	12652	2323	9826	6098	2173	9312	3196	603	444	403	89	160	1545	1314	2344	516	2001	39882	37984	28096	2724

Year, the several Diseases, Births, and Deaths of Males and Females, Age at Death, the and the Increase of Population. Compiled by Mr. B. Smith.

[the *Medical Times and Gazette.*]

TOTAL BIRTHS.	TOTAL DEATHS.	BIRTHS OVER DEATHS.	AGES AT DEATH.			DISTRICTS.					Mean Height of BAROMETER.	THERMOMETER.		Difference between the Temperature of the Week & the same Week on average of 7 Years.	General Direction of the Wind.	Amount of Horizontal Movement of the Air.	Rain in Inches.
			0 to 15.	15 to 60.	60 and upwards.	West.	North.	Central.	East.	South.		Dry.	Dew Point.				
											Inches.	°	°	°		Miles.	
1274	1297	477	593	445	258	205	250	194	285	363	30·001	36·0	30·9	— 1·0	S.W.	425	0·08
1542	1111	431	480	347	284	183	221	185	201	321	29·612	40·0	31·4	+ 3·8	S.W.	1465	0·12
1489	1096	393	477	360	253	163	226	165	249	293	29·467	46·3	41·4	+ 9·5	S.W.	1030	1·76
1598	1061	537	514	314	233	162	185	176	230	308	29·688	41·8	35·5	+ 4·2	S.W.	1195	0·44
1416	1002	614	445	335	212	140	221	167	199	275	29·716	42·1	36·4	+ 3·7	S.W.	940	0·54
1666	1016	650	437	346	223	133	196	171	232	284	29·805	47·0	41·4	+ 8·3	W.S.W.	1463	0·32
1401	970	631	441	332	197	120	194	160	237	259	29·645	38·8	33·5	— 0·1	N. & S.S.E.	150	0·22
1689	1072	517	452	383	237	155	211	187	233	286	29·871	39·8	32·8	— 0·8	W. & N.	1260	0·03
1628	1069	569	489	368	212	160	219	178	236	276	30·160	37·9	31·7	— 2·0	N.E.	790	0·16
1699	1128	571	466	399	250	170	230	175	193	360	30·061	36·4	28·4	— 4·4	N. & E.	650	0·02
1647	1232	415	521	437	274	222	222	237	255	296	30·300	40·0	33·5	— 1·5	N.E.	775	0·00
1710	1208	502	523	399	286	195	237	208	232	338	30·172	40·5	34·1	— 1·7	N.E.	630	0·00
1607	1219	388	504	441	267	191	221	204	273	330	29·814	45·5	35·2	+ 2·6	S.E. & N.E.	565	0·00
1730	1324	406	561	471	291	203	281	247	268	325	29·686	43·5	38·3	— 0·4	E.N.E.	800	0·12
1460	1051	409	463	354	229	175	205	206	200	265	30·073	44·0	38·1	— 1·2	E. & N.E.	545	0·00
1644	1092	552	473	393	222	203	198	205	220	266	30·012	47·0	39·7	+ 0·5	E. & N.E.	595	0·00
1608	1021	587	469	326	226	148	197	178	198	300	29·821	46·0	36·3	— 1·7	N.E. & E.	870	0·00
1536	1026	510	481	349	196	153	244	161	181	287	29·762	48·6	39·3	— 0·9	....	640	0·52
1660	972	688	451	339	176	118	205	184	197	268	29·995	48·1	36·5	— 3·5	N.E. & S.W.	495	0·00
1601	1070	331	503	365	198	193	178	209	212	278	29·728	52·7	44·6	— 0·2	S.W.	1220	0·30
1460	943	517	451	314	174	154	197	174	171	247	29·740	55·6	49·4	+ 1·1	....	320	0·84
1416	883	533	428	270	185	138	172	154	191	228	29·741	50·8	46·8	— 5·8	N.	480	0·87
1556	1000	556	481	335	184	176	201	162	205	256	29·687	52·5	42·6	— 5·7	S.W. & S.	575	0·20
1314	898	416	433	296	167	146	181	169	167	235	29·475	54·9	49·6	— 4·2	S.E. & S.W.	380	2·63
1586	903	683	396	333	170	133	189	148	187	246	29·379	55·2	47·3	— 4·6	S.W. & S.S.E.	865	1·09
1564	990	564	467	341	181	147	205	190	210	238	29·655	58·6	49·6	— 2·0	S. & S.W.	725	0·54
1513	987	526	416	383	187	152	183	158	241	253	29·809	59·7	50·0	— 1·3	S.W.	890	0·09
1314	1080	234	505	349	203	169	220	182	220	289	29·845	70·9	59·2	+ 9·2	S.E.	220	0·00
1428	921	517	460	286	160	146	175	156	209	235	29·852	67·3	60·2	+ 5·1	N.E.	350	0·27
1568	912	656	483	271	156	121	198	137	216	240	29·873	65·0	55·5	+ 3·5	Variable.	675	0·01
1430	1040	390	586	289	165	175	184	170	207	304	29·801	65·7	56·9	+ 4·4	N.E. & N.	385	2·04
1464	1124	340	656	299	165	162	229	231	234	268	29·379	63·3	51·4	+ 1·8	S.	815	1·01
1465	1091	374	611	303	171	166	197	181	260	287	29·380	59·7	50·5	— 1·7	S.W.	980	1·48
1639	1084	555	606	316	162	177	225	189	238	255	29·770	61·8	54·0	+ 0·9	Variable.	400	1·91
1499	980	519	558	277	144	148	190	165	198	279	29·953	64·2	56·0	+ 3·9	N.N.E.&S.W.	365	0·10
1524	966	558	527	284	153	163	203	162	183	255	29·979	62·4	51·5	+ 2·8	S.W. & S.E.	490	0·00
1437	936	501	485	296	154	130	206	188	195	217	29·789	60·7	54·8	+ 1·8	N.	520	1·40
1438	913	525	465	274	166	133	188	148	223	221	29·612	54·3	44·6	— 3·5	....	295	0·85
1640	1077	563	547	350	178	155	191	213	224	294	29·873	54·3	47·1	— 1·1	S.W.	335	0·57
1604	1251	353	574	443	224	164	214	213	282	378	29·403	52·2	45·3	— 1·5	N.E. & S.W.	357	1·31
1350	984	366	474	308	198	145	183	182	206	268	29·534	46·3	39·0	— 6·0	S.W. & N.W.	205	1·09
1607	1093	514	536	355	188	170	213	164	233	313	30·108	48·2	42·4	— 2·0	N.E.	475	0·03
1567	1072	495	535	348	189	155	232	190	234	261	29·945	49·9	43·9	+ 2·0	N.E. & S.W.	420	0·42
1400	1090	310	548	317	222	167	216	183	241	283	29·278	45·6	40·4	— 1·2	S.W. & N.W.	880	20·1
1644	1101	543	538	340	198	157	219	181	238	306	29·534	54·2	47·9	+ 7·7	S.W.	1395	0·84
1450	1022	428	499	321	167	145	199	170	234	274	29·759	51·2	45·8	+ 5·8	S.W. & N.E.	1270	1·30
1490	922	568	432	317	172	133	182	134	209	264	29·159	49·3	44·3	+ 5·2	S.W.	1090	1·77
1671	947	724	438	322	187	149	178	156	191	273	29·369	45·7	40·7	+ 2·3	N. & S.W.	965	1·46
1639	1042	597	462	359	218	176	201	165	226	274	29·710	42·4	36·5	— 0·1	S.W.	1165	0·33
1579	1012	567	455	340	213	160	195	184	231	242	29·520	49·3	44·1	+ 7·9	S.W.	1200	0·61
1662	1041	621	480	344	199	146	189	181	220	305	29·318	48·5	42·1	+ 7·5	S. & S.W.	1310	0·59
1351	871	480	382	301	172	145	174	147	196	209	29·746	46·8	40·6	+ 7·8	....	860	0·05
80484	54213	26271	25638	17784	10496	8295	10670	9324	11449	14475							
77871	55354	22517	25712	17999	11362	8326	10860	9474	11810	14884							

Provident Institution Savings' Bank, established in St. Martin's Place.—Copy of a Return made by the Trustees to an Order of the House of Commons, showing the total number of accounts open at that Institution on the 20th November, 1852, distributed into classes, arranged according to the profession, business, occupation, or calling of the depositors; showing the total number in each class, and the total amount at the credit of each class; to which is added, the average amount of deposits of each depositor, under the same classes.

Classification by Trades, Occupations, &c.	Nos. of each Class.	Amounts of each Class.			Average Amount of each Depositor in each Class.		
		£.	s.	d.	£.	s.	d.
Professional persons, and their wives	384	13,212	10	5	34	8	1
Tradesmen, shopkeepers, mechanics, artisans, their assistants, and wives	9,045	283,110	12	5	31	6	0
Clerks and employés in public and other offices, and their wives	1,190	35,863	1	11	30	2	8
Artists and teachers, and their wives, and governesses.....	703	21,624	8	5	30	15	2
Servants and their wives, and charwomen..	19,335	659,453	17	2	34	2	1
Labourers, porters, carmen, and carriers, and their wives	1,155	34,311	6	5	29	14	1
Soldiers, sailors, and police, and their wives	546	20,276	19	9	37	2	8
Lodging and coffee-house keepers, and their wives.....	242	8,688	6	6	35	18	0
Watermen, steamboat, railway, cab and omnibus employés, and their wives ..	173	6,619	9	5	38	5	3
Dressmakers, needlewomen, sempstresses, and laundresses	1,947	50,541	14	4	25	19	2
Other occupations not before enumerated ..	126	4,104	19	6	32	11	7
Widows and persons described as of "No occupation," or as "Married women"	6,550	257,314	0	2	39	5	8
Minors	5,249	76,116	13	4	14	10	0
Depositors before the passing of the Act of 1828, which first required the profession, occupation, &c. of depositors to be entered	1,364	55,832	11	3	40	18	7
	48,009	1,527,070	11	0	31	16	1
Add to the above the accounts of trustees of Charitable and Friendly Societies..	110	9,796	7	6	89	1	1
Makes the total of.....	48,119	1,536,866	18	6	31	18	9

Foreign Assurance Association.—We are glad to perceive that the advantages which have been experienced from discussion upon topics of interest common to all, by the members of the Institute of Actuaries, are likely to be enjoyed by the managers of Assurance Companies in Germany. A meeting has been held at Leipzig, at which several representatives of the leading Fire Assurance Companies attended, and at which an interesting discussion took place. We hope in our next number to give more details on the plan and objects proposed by this union.

CORRESPONDENCE.

UNIFORM ACTION OF THE HUMAN WILL.

To the Editors of the Assurance Magazine.

[*Extract of a Letter from* Herr Rath G. Hopf, *of Gotha, dated 24th November*, 1852.]

The last two numbers of the *Assurance Magazine* contain once more so many important and instructive essays, that the Editors, by publishing them, may justly be said to have well deserved both of assurance in particular and the sciences of statistics and mixed mathematics in general. Among the most valuable contributions, I reckon the two treatises "On the Uniform Action of the Human Will," the perusal of which has afforded me so much the greater pleasure, as I soon perceived that I agreed in opinion therewith on all essentials. I besides found in them a confirmation and further exposition of what I myself had been taught by former researches. We are told of a *law* of mortality, and there can be no doubt that such a law exists; but in spite of the impossibility of man to struggle against it, and the narrow allowance granted him to elude it, either by a dignified mode of life or by rational precautions against sickness and injury, this law does not regulate the facts within its compass with great conformity: at least these facts, although almost independent of human will, undergo greater fluctuations than others apparently subject to its action. Among the latter are, besides the cases quoted by you, the *births*. The proportion which the births bear to the numbers of the population commonly is a much more uniform one than that of deaths. I some years ago collected facts in reference to this question, which, with respect to Prussia, have led me to the following results:—

In the years 1816 to 1843, during which period the population of Prussia increased from 10 millions to 15½ millions, the average proportion of the births in this country amounted to 4·088 per cent. of the population a year, and that of the deaths to 2·886 per cent. But while the mortality of one year rose to 3·549 per cent., *or* exceeded by 22·95 per cent. the above stated average proportion, and that of another year lowered to 2·515 per cent., or fell short by 12·87 per cent. of the same average; the utmost fluctuations undergone by the births were between 4·487 and 3·652 per cent., or 9·77 per cent. *above* and 10·68 per cent. *below* the average proportion. The deaths, therefore, required for their fluctuations a scope of 36 per cent. of the regular ratio, whereas the births varied only 20 per cent.; and the former proved much less constant than the latter, though human will is allowed to exercise an influence on births which it cannot exercise on deaths. But this will Providence has limited by the action of instinct, the effects of which we see are far more uniform than the working of the law of mortality. Considering this, assurances for births, when established on a large scale, might be granted with greater safety than for deaths.

It is a fact, that 5 to 6 per cent. more boys than girls are born; but the cause of this fact does not seem to me to be as yet sufficiently fixed. Hofacker, a German, and Sadler, have indeed found, that from marriages up to a certain age of the married persons there will be got so much the more boys, the more the age of the husband exceeds that of the wife. When

it is therefore considered that, at least in Germany, the husband on an average uses to be by 5 to 6 years older than his wife, this difference of age would be sufficient to make good the excess of the male births. Yet this difference of age, instead of being the true operative cause of the fact in question, is in my opinion only another parallel exterior fact, unable to account for the other. We first find that the illegitimate births show a smaller proportion of the excess of boys (in Prussia are among natural children only 103 boys to 100 girls); and yet we are not entitled to suppose the difference in the ages of the parents of natural children to differ materially from that of the parents of legitimate ones.* Another most striking abnormity occurs with the Jews, who, amounting in Prussia to about 200,000, make at present about $1\frac{1}{3}$ per cent. of the whole population of the kingdom of Prussia. Among this race, according to facts collected from a period of 15 years, the proportion between births of girls and births of boys being 100 to 111·21, the male births were prevalent in a degree probably never heard of among any other race. A large portion of the Jews, chiefly in the eastern provinces of Prussia, live in the greatest indigence; the numbers of the marriages concluded among them are less considerable than among the Christians, especially the improvident ones are much less frequent, because in all such acts the Jews do not suffer themselves to be more operated upon by passion than guided by reason. But though, according to this statement, the proportion of the regular marriages among the Jews is a smaller one than among the Christians, such of the Jews as marry will generally enter upon wedlock in an earlier age—a circumstance which accounts for the greater fecundity of their marriages. Now it is evident that the earlier a man marries, the less in general his age will exceed that of his wife. We must therefore think ourselves justified in drawing the inference, that with the Jews the difference of age in the married persons is smaller than with the Christians; which being acknowledged, the above-mentioned excess of male births must appear still more strange, and is in no concordance whatever with the statements of Hofacker and Sadler, whose observations were limited to the Christian population. How is this abnormity to be accounted for?

There has been established an hypothesis in former times (if I am not mistaken, by the late Hoffman, of Berlin, the distinguished statist), according to which the sex of the child depends less on the difference of age in the parents, than on the predominating affection and excitement of either the father or the mother in the act of begetting. With this hypothesis agrees an old tradition of the Jews, according to which, among other purposes of the circumcision of their children, one is mentioned importing that not only cleanliness is forwarded by it, but also the procreative power strengthened, and in consequence the increase of the Jewish race promoted. If this really proved to be the case, the hypothesis in question would be supported by it; for the stronger affection, the greater excitement, would then reside with the man, and consequently effect an excess of male births.

Another fact, which remains to be considered, refers us to the same cause to account for the abnormity in question. It occurs much more

* On the contrary, I might think the age of the father in illegitimate intercourse, on average, will surpass that of the mother *more* than in legitimate ones, because the average age of the mother in former is undoubtedly lower than in latter.

frequently with the Jews than with the Christians, that the father disposes of his daughter in the affair of marriage, without caring for her inclination or dislike. There are, in consequence, among the Jews far more marriages in which the affection of the husband for his wife is greater than *vice versâ.* This fact would afford a second cause why, according to the above-stated hypothesis, the male sex is so greatly prevalent among the Jewish children. As to the Christian population, the same fact, within the limits already indicated, would account also for the excess of male children among them; for love and excitement depend also, to a certain degree, on difference of age—the greater this difference between the two consorts, the greater will be the excitement of the one who has the advantage of age. The inclination of the elder part to the younger uses to be greater than *vice versâ;* and if, therefore, the sex of the elder predominates among the children, it is because he is under the strongest sensual affection.

This supposition being admitted, the lower proportion between the illegitimate male and female births, which is more favourable to the latter, can no longer be wondered at, when it is considered that the affection of the man, though still preponderating, cannot in this case surpass that of the woman so far as to produce the same results which proceed from regular marriages. Women undergo much more serious disadvantages in non-connubial intercourse, and are more effectually warned against it by the whole of their social and moral situation, than men. They therefore must be under an extraordinary violence of passion before they will be led to yield to it.

Be this as it may, the facts here stated of the births among the Jews, and those taken from the illegitimate intercourse of the two sexes, will suffice to show that the difference of age in the parents cannot in itself be the cause which effects the excess of the male births, but that this fact must be founded on deeper physiological causes, with which, however, the more advanced age of the father will frequently coincide.

The Jewish population of Prussia, and probably also of other countries, exhibits still other remarkable abnormities. It being a fact, as is known, that of new-born boys a larger proportion die in the first year of life than of new-born girls (in Prussia 116·110), it ought to be presumed that, considering the predominance of boys among the Jews, the mortality of their children should be greater in the first year than among the rest of the population. Nevertheless, just the contrary takes place. In the whole kingdom of Prussia, 17·3 per cent. of the born-alive die in their first year of life; of the children of the Jews, on the contrary, only 13 per cent. Nay, what is more, the smaller proportion of mortality among the children of the Jews is to be observed on their very births, for out of all their children only 2·5 per cent. are stillborn; whereas this proportion amounts, for the whole population, to 3·51 per cent. In the same manner, also, in after life, a less high mortality seems to obtain among the Jews. In Prussia, to 100 Jews living—

The Annual births were . .	3,537
The Annual deaths . . .	2,127
Surplus of births . .	1,340

In the whole population this proportion was, according to the above statements,—

Births	4,088
Deaths	2,886
Surplus of births . .	1,202

Out of 100 dying persons there were, in the whole population, 11·71—among the Jews, on the contrary, 15·40—that attained an age of upwards of 70 years. More exact data are wanting.

The proportionally small numbers of the still-born and the deaths in the first year are to be declared, when one takes in consideration that Jewesses only in very rare instances perform hard work out-of-doors. They use to take great care, both of themselves during their pregnancy, and of their children while they are suckling them; whereas the majority of the Christian women, either on account of hard agricultural labour, or because they are employed in other bodily out-of-door work, are always exposed to the influence of the weather, and cannot afford to take care either of themselves or their children. The other fact, however, that a large proportion of the Jews, although they live in great poverty, and are obliged to undergo a great many privations, attain a comparatively high age, unless it be founded on deeper physiological causes, is to be accounted for by their living mostly very soberly, and by the moderate use they make, almost generally, of intoxicating liquors. On the whole, the example of the Jews may be said to show how many lives might be preserved, if a rational heedfulness of the pregnant and suckling female population, and a greater temperance in the use of brandy, became more general among the majority of the population.

Considering these facts, we are entitled to give the Jews credit for a higher vital power, or a greater toughness of life. They are therefore to be looked upon as welcome members of Life Assurance Societies. Nevertheless, I should not advise insuring them at lower rates than other persons; I should do so, as little as I can approve of lowering the rates of assurances of women. The fact, indeed, is correct, that females in general are subject to a less high mortality than males; but not less correct and beyond doubt is the other fact, that such females *as insure themselves* die quicker than males. This Society has made very unfavourable experiences in this respect.

I must add, that the researches of Hofacker have been but incompletely published by Quetelet (*Sur l'Homme*, I., p. 55, *seq.*), who followed the *extract* of the original work contained in the *Annales d'Hygiène*. The former is entitled, "*De qualitatibus Parentium in Sobolem prodeuntibus, præsertim rei equariæ. Dissertatio inauguralis med. auct. Hofacker. Tubing.*, 1827, 4." These researches are based upon facts, which consist of 2,000 births in the city of Tubingen; it is to these that refer the two Tables A and B, which I subjoin to these remarks, the former of which Quetelet has communicated but incompletely, leaving the latter altogether aside. Hofacker has extended his researches also over the rural population, but to a far more limited extent. He in this respect finds in a village, that there were born—in

43 marriages, where the wife was older than the husband, 83 boys and 103 girls;

17 marriages, where the husband was older, by 9 to 12 years than the wife, 46 boys and 33 girls;

11 marriages, where the husband was 50 to 60 years old, 10 boys and 4 girls.

In other villages he found similar proportions; and on the whole his researches lead to the conclusion that in cases where the wife is older than the husband, the proportion between the girls and boys is 1031:1000.

May these hasty communications be no unwelcome contribution to your further investigations in the science of vital statistics! A new census having been instituted in England at the end of the year 1851, the report of the General Registrar, so invariably composed with the greatest solidity and exactness, will perhaps bring forth facts tending to illustrate more particularly this strange occurrence.

A.

Age of the Husband.	Age of the Wife.	Number of Marriages.	Births.		Ratio of the Sex.	
			Males.	Females.	Males.	Females.
Younger than his wife		117	270	298	90·6	100
Same age..		27	70	75	92	100
Older by 1 to 3 years		66	190	163	163	100
„ 3 to 6 „		81	237	229	103·4	100
„ 6 to 9 „		30	106	85	124·7	100
„ 9 to 12 & upwards		65	161	112	143·7	100
		386	1,034	962	107·5	100
24 to 36	16 to 26		175	150	116·6	100
	26 „ 36		361	383	94·2	100
	36 „ 46		33	36	95·4	100
36 „ 48	16 „ 26		23	13	176·9	100
	26 „ 36		151	132	114·3	100
	36 „ 46		190	174	109·2	100
48 „ 60	16 „ 26		1	1	..	..
	26 „ 36		19	10	190	100
	36 „ 46		46	28	164·3	100

B.

Age of the Father.	Births.		Ratio of the Sex.	
	Males.	Females.	Males.	Females.
24 to 36 years	599	599	100	100
36 „ 48 „	364	319	110·9	100
48 years and upwards	66	33	200	100
Age of the Mother.				
16 to 26 years	199	164	121·4	100
26 „ 36 „	531	525	101·1	100
36 „ 46 „	299	268	111·2	100

REVIEWS OF NEW WORKS.

Essays on Life Assurance. By EDWARD SANG. (*Read before the Society of Arts for Scotland,* 1839-40.)

MR. EDWARD SANG'S name is well known to actuaries in England as that of an author of a very elaborate collection of Life Assurance and Annuity Tables in illustration of the Carlisle rate of mortality. He is also almost equally well known in Scotland as the writer of the above Essays, which Mr. Wm. T. Thomson, of Edinburgh, who was in possession of the remaining copies, has kindly had gratuitously circulated among the members of the Institute of Actuaries in England, in consequence of some remarks at a recent Institute meeting at which that gentleman so efficiently presided. We have accordingly read and re-read Mr. Sang's Essays very carefully, and have thereby become convinced that what he wrote he also honestly believed; but, with every disposition to judge favourably, impartiality obliges us to think that, had Mr. Sang enjoyed the opportunities of a wider official experience, he would have considerably modified some of his notions, and abated some of his apparent desire to be showy and pungent, at the risk of obscuring better attributes. Every true mathematician must regret, for instance, such an offence against ripe scholarship as the introduction of the following piece of algebraical rhodomontade, as the only specimen of algebra throughout the Essays, merely to express the simple arithmetical notion that when we cannot fairly detect the law of any series of numbers, we are ostensibly compelled to use the numbers themselves.

Taking a more general view of the subject than that which would be presented by the method of minimum squares, let ϕ denote an arbitrary function of the corrections whose sum is to be a minimum; put also ${}^0x$, ${}^1x$, ${}^2x$, &c., for the quantities actually observed, ${}^0X$, ${}^1X$, ${}^2X$ for the corrected ones; then would we have $\phi\,({}^0X - {}^0x) + \phi\,({}^1X - {}^1x) +$ &c. $=$ min. This condition of minimum resolves itself into the following equation:—

$$\phi'\,(X - {}^0x)\,\delta\,{}^0X + \phi'\,({}^1X - {}^1x)\,\delta\,{}^1X, + \text{\&c.} = 0.$$

Now here I observe, that if the nature of the law that ought to connect the quantities ${}^0X$, ${}^1X$, &c. be entirely unknown, that which should connect the variations $\delta\,{}^0X$, $\delta\,{}^1X$, &c. must be just as little known, the one being a mere sequence of the other, and that therefore, so far as our knowledge goes, these variations are entirely independent of each other; so that we must have the separate equations

$$\phi'\,({}^0X - {}^0x) = 0, \quad \phi'\,({}^1X - {}^1x) = 0, \quad \text{\&c.}$$

Assume, then, that from the nature of the arbitrary functions ϕ, $\phi' c = 0$, we shall have ${}^0X - {}^0x = c$, ${}^1X - {}^1x = c$, &c.; that is, all the quantities found by observation must be increased by a certain constant c, this constant being the error of position of the zero point of the scale by which the measurements are made. In our case there is no such error, and therefore we must have

$${}^0X = x, \quad {}^1X = {}^1x, \text{ \&c.,}$$

so that, while working towards an unknown law, the condition of optimism requires that the actual results of the observations be used." (Pp. 3, 4, *Essay I., On the Law of Mortality.*)

Here, then, we have the differential calculus and the calculus of variations literally dragged in, not to usefully overcome some otherwise insurmountable difficulty, but, as we might almost suspect, for no better reason than to gratify the desire for a little display. It is the fairer to impute this false taste to Mr. Sang, because he had just before evinced a characteristic feature often combined with it, namely, a desire to sneer at great names. "*The*

method," he exclaims, "*of minimum squares of M. Legendre is arbitrary; why not minimum biquadrates? The whole matter is open to investigation; and, seizing the opportunity, I, &c.*" (P. 3.) Now Mr. Sang ought to have known, not merely that M. Legendre did not attempt to demonstrate the method of minimum squares, but that Gauss and La Place did attempt to do so, the former aided by the consideration of equi-probable errors, and the latter, with complete success, by that of equi-possible combinations.

Leaving the analytical path, Mr. Sang passes on, in his Second and Third Essays, to what may be called the mechanical view of life assurance matters. Towards this direction Mr. Sang's strength was principally exerted; and allow him his mechanical basis or set formula upon which to place his lever, and he might fairly essay, like a true disciple of Archimedes, to overturn the assurance world. But it is the very denial of this mechanical basis, of this *point d'appui*, that calls into exercise the profession of the actuary, and prevents the accountant or mechanician from stepping into his place. Popularly speaking, a table of mortality is supposed to be an exact picture of the events to come, and of course can be treated mechanically as such; but as expounders of the doctrine of probability, considerate actuaries should not forget its express and chief canon, that although $\frac{a}{b}$ may, *pro tanto*, be taken as the true chance of mortality for a single life, yet that it is not therefore even probable that out of b lives exactly a will die; and yet, in his Experimental Society, as displayed in these Essays, Mr. Sang has somewhat complacently taken the whole difficulty of deviation as solved by ignoring it, and supposed that in every year the *exact* number of deaths can be so efficiently predicated as to form set and stated elements in the annual progress of a commercial account-current. Had Mr. Sang really been the manager of an office, and dealt with business transactions in place of hypothetical ones, he would soon have had it forced on his attention that the laws of average were the only reigning laws in life assurance, and that it was no part of those laws that a society must of necessity always be in the state represented by the table of mortality, *pari passu*, but must openly be expected to deviate between certain extremes; and that it was therefore only by dealing with actual transactions, apart from theoretical loading, that the actual average could ever be really enunciated, because subject to differences in different societies, and therefore productive of different balance sheets. Indeed, the mere introduction of interest of money not only disturbs the popularly hypothetical state of things, but renders the average of so mixed a character, that as yet no definition has even been promulgated by theorists as to the relation existing between the expected deviations from a table of mortality and the consequent effects upon a table of annuities, and therefore upon a Life Assurance Company's valuations from year to year, even supposing the sums assured upon each life to be equal. We of course know, that if $d \pm x$ deaths be expected to follow $c \pm y$ deaths, that the average would not be disturbed by the substitution of $c \pm y$ deaths following $d \pm x$ deaths; but directly we employ even a constant, in place of a fluctuating, rate of interest of money, the whole state of the matter is changed, except in that solitary case in which $c \pm y$ and $d \pm x$ may happen to be equal.

Had, then, Mr. Sang devoted his thoughts and acquirements to the resolution and practical elucidation of such problems as these, he might

indeed have claimed pre-eminence as a teacher on the subject, and as an originator of real novelties; but in the absence of these, our fear is, that however terse some of Mr. Sang's dicta may appear, and however fearless may be his apparent exposure of what he conceived to be fallacies, that his reputation in England will be rather weakened than strengthened by the general perusal of these Essays, considering how deservedly high he has been hitherto appreciated as the constructor of the tables already alluded to, and which are, indeed, at once a noble record of his industry, and an imperishable memento of what might have been expected from his calculative talents, had circumstances induced him to prosecute still further his intention of seriously adopting the actuarial profession, and thereby becoming imbued with those monetary tactics, without which no monetary transactions can ever be brought to a practically successful issue, dependent as such successful issues necessarily are, both upon the avoidance of exorbitance, exciting competition on the one hand, and theoretical rashness, weakening commercial credit on the other.

As examples of Mr. Sang's general style and notions, we freely insert the following copious quotations. The first is from Essay II., "On the Error of the Bonus system."

Thus, both by precept and by example, is brought out the great primary objection to the bonus system—

That it enables the present members to appropriate to themselves all the over contributions of their predecessors, as well as to draw largely upon the contributions of their successors; and it rather aggravates than palliates the evil, that, on account of the involved nature of the transaction, all this may be done unwittingly with the best intentions in the world.

In the case of a Mutual Society, it is evidently proper that the interests of all classes should be alike, and that any arrangement which sets these interests in opposition to each other must be injurious to the welfare of the whole. To have shown, then, that the bonus system has this tendency, and that it gives to one class the control of the interests of other classes, and to have cited a single example of the actual operation of this evil bias, is sufficient, in my estimation, to condemn it, and to lead us to look out for some other arrangement free of such defects. (P. 20.)

The remainder are from Essay III., "On what constitute the Profits of a Mutual Assurance Society, and on the only Equitable Method of Distributing these among the Members."

It is a singular fact, that, on a matter apparently so simple as the profits of a Life Assurance Society, and also so important as to be constantly before the minds of men of business, the most opposite ideas are entertained and acted on. Sums of money amounting to millions of pounds are actually distributed, not according to what is just and equitable in itself, but according to some mere opinion founded on some scheme for obviating one error by the commission of another.

The crudest of these ideas, and that one which I must first discuss, is this—That the profit on any policy is the excess of the premiums paid over the sum assured; and the most absurd of its corollaries—That therefore no member who has not paid up, in premium and interest, the full sum assured upon his life, can be entitled to share in profits to which he has contributed nothing. (P. 21.)

Such a notion can only have sprung up in a mind that had at the time forgotten the whole drift and intention of life assurance; and notwithstanding the high authority of the *Quarterly Review*, I fear not to assert that the maintaining of it betrays the most narrow and short sighted views of the subject.

The very intention of a Life Assurance Society is to provide a sum for the heirs of those who die soon, out of the contributions of those who are fortunate enough to live long; and it sounds rather odd to say that the society sustains a loss by the accomplishment of the very purpose for which it was designed. If every one lived during the average time computed for him there would be no loss; and in the same way, were there never to be any fires, Fire Insurance Companies never would sustain a single loss—how wealthy they would soon become!!

The idea that those members of a Mutual Assurance Society through whom loss is sustained have no right to share in the profits, thus amounts, when fully carried out, to a dissolution of the Society, so far as a community of risk is concerned; and is, therefore, subversive of all the principles of assurance. "Oh! but," exclaim the advocates of this principle, "we never intended to carry it to such an extent as you have done." Very true; and the reason is, that not having understood the nature of the principle, you never dreamed that it could be carried so far. But to take a milder case, I shall instance a Yearly Mutual Fire Insurance Society, who find at the end of the year the total receipt in premium greater than the total loss by fire, say double of it. Then is it not quite clear that if this could have been foreseen only half the premiums would have been exacted; and that had this half only been taken, those parties even through whom loss was sustained would have paid less; so that the surplus falls to be distributed among the whole of the policy-holders? In such a society there is established, for the time, a perfect community of property *quoad* fire, and the society has no business to inquire (in distributing either the profit or the loss) whether the damage have been done on the property of A or on that of B.

Let us imagine a Yearly Life Society, for simplicity having its members all of one age. At the commencement of the year each has paid his premium to assure £100, should he die within the year. At the end of the year it would be known whether a greater or less number of deaths had occurred than the expected number, and the overplus or deficiency would at once be known. It seems to me to be quite clear, that in case of an overplus, part would need to be returned to the heirs of the deceased members; just for the same reason, that if a deficiency had occurred these heirs would have had their proportion of that deficiency retained from the sum assured. If this principle hold in a *yearly* society, it is quite clear that it must extend also to a life one. (P. 22.)

Thus it has been usual to consider only those who have whole life assurances as entitled to share in the profit. I presume that this has not been arranged because there is any impropriety in a member till sixty, or during any limited term, receiving that share of the profit to which he is justly entitled, but because the method of computing his share has transcended the powers of the calculator.

The general nature of the question is stated in the following proposition:—

A number of persons form themselves into a society for assurance against certain contingencies of life. Some wish to secure a certain payment to their heirs in the event of their death, paying the price of it at once, in several terms, or annually during life; others wish to secure a sum to themselves should they attain a certain age, and so on.

To carry this scheme into effect, the prices of the various risks are computed, as near as may be, according to the best existing information, and some addition is made for the sake of security.

After a lapse of time the over payments will have accumulated, and will fall to be divided among the partners. (P. 40.)

The first branch of the question relates to the *time* at which the apportionment ought to take place. This must be determined by a reference to the nature of the transaction gone into.

Each member has agreed to pay a certain premium during the currency of his policy, or during part of that currency, on condition that he shall obtain a certain payment when the policy falls, and shall have a share in the profit or loss of the society. It seems to me perfectly clear that the agreement is to last during the whole currency of his policy, and that no member is entitled to claim his share of the profit until his policy expire. He is not entitled to draw out his share of the profit at any intermediate time.

This principle is implied in the scheme of declaring a bonus.

It would evidently be very unsafe to allow the existing members to draw out in ready money any of what might appear as surplus. This would be to go against the general tenor of the transactions, which tenor is, that the gross price shall remain deposited during the currency of the policy, that the overcharge contained in it may afford a guarantee for the sum assured. Were a payment in ready money to be made, how would the public look upon the transaction? Persons intending to become members would at once take the alarm; the rather so, if they observed parties who had entered only a few days before the division bringing off, as their *share* of profit, more than they had paid as premium. Such an arrangement would give full scope to the cupidity of the existing members, and would not bear the light. No one, say the lookers on, ought to have his share of the profits until the profits realized during the whole currency of his policy shall have been ascertained. The scheme of bonus, I repeat and insist upon, is just this arrangement concealed by a very flimsy veil, and rendered by that very disguise still more dangerous.

A body of men met in deliberation would hesitate before they put in their pockets a

sum of ready money. They would consider over and again whether it were proper to take it; but a bonus, a sum *never to be touched by themselves*, does not awaken any such doubts, and although it did so, the resolution of those doubts is in many cases beyond their own power. Yet how very flimsy is the veil! In some societies the bonus may be surrendered, and the price of that surrender had in READY MONEY. The society dare not declare a ready money bonus; it proceeds to compute the equivalent contingent bonus, which contingent bonus it assigns, and then allows the members, if they choose, to dispose of that contingency. Were the sums of money so operated on trifling, this roundabout process would afford some amusement, the actual calculation bearing the strictest resemblance to those operations described in our elementary treatises on arithmetic as proofs. The flimsiness of this contrivance is remarkable, and has at once been detected by those north of the Tweed; their contrivance is one degree more knowing, and consists in allowing the members not to sell the contingency to the office, but to claim a corresponding deduction from their annual premiums. This certainly keeps the character of the transaction better out of view, but it does not change that character; nor, indeed, would that be changed by a refusal to compound in any way for the additional assurance.

The real state of the agreement between parties is this—that each is willing to deposit a certain sum, regulated by the best information to be had, and agrees to abide the result of the best information to be obtained at the expiry of his policy. Not until the actual expiry of his policy, then, should any declaration be made of the share of the capital stock belonging to him. I shall be told of the *difficulty* of making such a valuation. I am, however, not avoiding, but seeking difficulties; no other first step toward the overcoming of them being known to me: the difficulties are there, whether we look at them or not. (P. 41.)

On referring to the "Select Papers read before the Society of Arts of Scotland" for the same period, we find Mr. Sang's Essays followed by a very excellent paper in opposition to them, read before the Society, 25th March, 1840, entitled "Remarks on the Profits of Life Assurance Societies, and the division thereof; with reference to certain statements contained in Mr. Sang's Essay on Life Assurance Societies. By William Wood."

Our want of space would prevent us entering upon Mr. Wood's paper, even if the consideration did not, that the general subject is one that has already been treated of more than once in our own pages.

Rational Arithmetic. By Mrs. G. R. PORTER. London: John Murray, Albemarle Street. 1852.

WE have much pleasure in calling attention to this little work, the professed object of which is, as the author states in the Preface, "to assist in rescuing arithmetic from the degraded rank it at present occupies among intellectual pursuits."

The author's aim is to show the *rationale* of the science, and not only to teach arithmetic, but at the same time to exercise the mental faculties of students; and, as she says in the words of Locke, "not so much to make them mathematicians as to make them reasonable creatures." To this end the author has avoided giving any rule without first having shown upon what principles the rule is founded.

Few writers have treated arithmetic on this plan; and while almost every scientific subject has been theoretically and well handled by many competent authors, we can scarcely name one, but De Morgan, who has departed from the old routine plan of the school treatises on arithmetic. This is a step in the right direction, and Mrs. Porter's work will prove a valuable first-book to the student in our profession—it will teach him to reflect, and bring forth and strengthen his reasoning powers, and enable

him to grapple with the severer studies in mathematics necessary to enable him to read with advantage the somewhat difficult works on the doctrine of annuities and assurance.

We can strongly recommend this book, which will be found to contain a good collection of examples, and those too of a superior class, actual statistical facts being worked up into entertaining and instructive questions.

We would call particular attention to the chapters on arithmetical and geometrical progression, and on permutations and combinations, on which the first principles of the theory of life assurance depend.

A Treatise on Investments; being a popular exposition of the advantages and disadvantages of each kind of Investment, and of its liability to depreciation and loss. By ROBERT ARTHUR WARD, Solicitor, Maidenhead, Berkshire. Second Edition, greatly enlarged. London: E. Wilson; and Simpkin, Marshall, & Co. 1852.

THIS is not only a very original but an extremely useful production. Its object, as the author states, is "to give to capitalists such information of the advantages and disadvantages of each kind of investment, as will enable them to place out their money in the manner they may deem most desirable"; or, as he better explains further on, "to put the capitalist in possession of such information as will enable him to judge for himself of the value of any investment that may be offered to him, and to give him knowledge through which he may perhaps be enabled to save his property from depreciation, and possibly from entire loss."

It is but justice to him to say that he does this very completely and effectually, combining the knowledge of the lawyer and the capitalist, and bringing to bear also so much as is needed of that of the land agent and surveyor. The work is divided into three parts, the first of which is subdivided into twenty-two chapters. We give the titles of them, that the reader may form a better idea of the number and variety of the subjects treated of.

PART I.—1. The elements of a good investment; the object in investing; and the rate of interest usually obtained. 2. The very important effects on all kinds of property, which will result from the gold discoveries. 3. The purchase of lands and houses by auction and private contract; and contains a popular explanation of the usual conditions of sale—of the liability of an investment in land to loss or depreciation, and the protection afforded by covenants for title—of the rate of interest obtained by investing in the purchase of land and houses, and of the facility with which such property can be turned into money, and of the ease with which rent can be recovered. 4. An exposition of the peculiar characteristics of copyhold property. 5. Estates for life. 6. Reversionary interests. 7. Leasehold property. 8. Ground rents. 9. Lordships of manors. 10. Tithe rent charges. 11. Advowsons and next presentations to livings. 12. Policies of life insurance. 13. Redemption of land tax. 14. Ordinary partnerships. 15. Shares in joint stock undertakings, and shows the liability incurred by shareholders. 16. Railway shares; written by Mr. E. J. Herapath, a great authority on such a subject. 17. Mining speculations. 18. Building societies. 19. The funds and Government securities; Bank

stock; East India stock; and East India bonds. 20. Turnpike bonds. 21. Mortgages, showing the different positions of first, second, and subsequent mortgagees, and of equitable mortgagees, and the powers possessed by each of realizing their securities; and treating on mortgages of copyholds, reversions, life estates, leaseholds, tithes, advowsons, next presentations, and personal goods, and of railway debentures. 22. Judgments, bonds, and inferior securities.

PART II. Contains calculations of the amount to be allowed for fines and fees in purchasing copyholds; of the value of a life estate, by reference to life insurance tables; of the value of a reversion, of leaseholds, of an advowson, of a next presentation, and of a policy of life insurance; an estimation of the amount of fines payable to the lord of a manor; and a method for calculating tithe rent charges.

PART III. Contains twelve tables for assisting in making calculations of the values of different kinds of properties.

To the managers of Insurance Companies, banks, and other monied interests, as well as to the legal profession, the book is invaluable. Scarcely any one of the vast number and variety of securities constantly offered to them, but will be found sufficiently described in its pages, the advantages of the investment enumerated, and the peculiarities, liabilities, and defects of it clearly and sensibly pointed out.

REPORTS OF ASSURANCE COMPANIES.

Eagle Insurance Company.—Annual General Meeting, held August, 1851.—The report for the year ending 30th June, 1851, shows amongst other particulars that—

	£.	s.	d.
The premiums received on assurances effected during the year amounted to	5,339	13	9
The total income of the year to	140,338	1	9
The claims on decease of lives assured to	83,691	1	9
The expenses to	5,686	5	0
The total assets of the Company to	704,010	14	0

With the exception of one or two items, this report differs but little from that presented at the last annual general meeting. In the year just ended the directors have issued 254 policies, for sums averaging rather more than £600 each. In the preceding year 262 were effected, the average of each being £656.

The amount of claims arising from the decease of the lives assured is greater this year than the last, but the annual average for the four years since the last valuation is still not more than £64,100; moreover the average duration of the policies under which they have accrued has been very considerable, so that the premiums paid in respect of them and of policies otherwise terminated have gone far to provide for the total sum claimed, and thus the accumulations from the existing assurances suffer but little diminution on this account.

The proprietors will observe that a rather considerable profit has accrued during the year from the realization of reversions. Looking upon this as so much additional interest received, and coupling it with other.

items of that character, it will be found that the rate per cent. realized during the year on the total assets at the commencement of it is not less than £6. 6*s.* per cent.

The expenses of management are a little more than they were in the preceding year, owing to some extra expenditure in advertisements and in the establishment of agencies.

The chairman stated amongst other matters that their income, which four years ago was £60,000, was now £140,000, and that the increase in the expenses of management between 1851 and 1850, alluded to in the report, was only about 6 per cent.

In reply to a proprietor, it was stated that there were about 22,000 shares, and the amount of capital was £121,000.

Eagle Insurance Company.— The Annual General Meeting of the Proprietors, held August 18th, 1852, *to receive the Report of the Directors as to the Progress of the Company during the year ending the 30th of June last, and also as to the result of the Quinquennial Investigation, and the Bonus to be thereon declared.*

REPORT.

"The first quinquennial investigation of the liabilities of the Eagle Company since its junction with the Protector, in 1847, is an event which the directors, and no doubt yourselves, regard with much interest. It will now for the first time be seen to what extent that arrangement has been advantageous, and how far the favourable anticipations which were entertained when it was originally entered into have been actually realized. Before they proceed, however, to lay before you the result of this inquiry, it will be proper to advert briefly to the transactions of the financial year just concluded, and with this view they beg your attention to the following report received from your auditors."

The auditors' report was here read, from which it appeared that the income of the year from new premiums was £5,947. 4*s.* 2*d.*; from renewal premiums, £90,670. 4*s.* 5*d.*; and from interest, £31,433. 19*s.* The claims were £60,177. 9*s.* 4*d.*; the amount allowed for surrender of assurances, £4,706. 4*s.* 4*d.*; the expenses, £5,683. 19*s.* 5*d.*; and the total assets, £738,884. 17*s.* 11*d.*

"This statement differs in nothing very materially from those which have been submitted to you during the last two or three years, save as regards the amount of claims on decease of lives assured. This, the directors are happy to say, is less, as compared with that of the previous year, by the sum of £23,513. 12*s.* 5*d.* On the other hand, the premiums on new assurances are greater by upwards of £600; the amounts in the two years being respectively £5,339. 13*s.* 9*d.* and £5,947. 4*s.* 2*d.*

"As the transactions of the year will be necessarily included in the review to be taken of the quinquennial interval just terminated, your directors will not detain you further with this report, but, proceeding at once to the more important business of the meeting, will now request your attention to the following report received from your actuary:—

ACTUARY'S REPORT.

"'To the directors of the Eagle Insurance Company.—Gentlemen,—In conformity with the regulation adopted at the annual general meeting in

1847, by which it was ordered that thenceforth the surplus should be determined and divided quinquennially instead of septennially, as theretofore, an investigation was commenced early in the present year as to the condition of the various assets of the Company, and the nature of the very numerous assurance contracts which it has entered into, so as to determine, as soon after the 30th June as possible, the liabilities existing under them, and the precise position of the Company's affairs at that date. This portion of the work is now completed, and I have the honour to submit the following as the result of it:—

"'It appears that the assurances in force in the Eagle Company on the 30th June, 1847, were 2,684, assuring £1,827,050, and paying premiums of £58,705; whilst those added by the junction with the Protector and another small Assurance Company consisted of 1,315, assuring £1,005,469, and paying premiums of £34,575. The number effected since is 1,299, assuring £806,956, and paying premiums of £29,695. These together make a total of 5,298, assuring £3,639,475, and paying premiums of £122,975. Deducting the number lapsed during the five years by decease of the lives assured, and other causes, there remained in force on the 30th June last 3,914, assuring £2,723,512, and paying premiums of £92,759, the number of each class being as exhibited in the following schedule:—

Class.	Number.	Sums Assured.	Additions to Sums Assured.	Annual Premium.
		£. s. d.	£. s. d.	£. s. d.
1	3,430	2,351,971 14 3	84,453 3 1	81,889 11 8
2	21	15,619 4 0	1,354 11 5	465 13 0
3	68	68,344 18 6	644 5 11	2,276 1 11
4	135	55,804 16 0	331 3 0	2,422 17 11
5	34	22,338 2 3	289 5 11	1,130 9 10
6	41	23,556 10 0	178 11 3	510 19 5
7	48	42,313 0 0	134 11 9	712 0 1
8	11	4,421 7 6	..	133 14 10
9	80	51,756 17 11	..	1,141 11 8
10	..	extra risks,	..	1,674 15 9
11	3	(224 19 6)	..	28 15 4
12	10	(2,279 14 6)	..	372 18 7
13	33	(1,516 4 2)		
	3,914	2,636,126 10 5 (Per ann. 4,020 18 2)	87,385 12 10	92,759 8 3
Reassurances exclusive of those securing return of money advanced	53	75,193 17 0	1,524 16 0	2,868 4 6
		2,560,932 13 5 (Per ann. 4,020 18 2)	85,860 16 10	89,891 3 9

"'A careful and rigorous estimate has been made of the liability as regards the sums and previous additions guaranteed under all these contracts, and also of the value of the premiums payable in respect of them, and a similar process had been gone through with regard to the reassurances effected with other Companies, the number and particulars of which appear in the foregoing schedule. The several items constituting the assets of the Company have also been carefully revised, and due allowances made

for any changes tending to increase or diminish their value. The result of all these operations will be seen in the following statement, which exhibits the total value of the Company's assets and liabilities, as they existed on the 30th June last:—

Assets.

Cr.	£.	s.	d.
Assets of the Company, as shown by the auditors' report	738,884	17	11
Present value of £92,759. 8*s.* 3*d.* per annum, receivable in premiums	1,003,938	0	6
Present value of £76,718, reassured with other Companies	39,585	14	6
Total	£1,782,408	12	11

Liabilities.

Dr.	£.	s.	d.
Interest due to proprietors	4,744	3	9
Claims and additions unpaid	26,932	12	2
Annuities, &c. due, but unpaid	938	10	5
Present value of £2,723,513, assured by the Company	1,380,515	5	0
Present value of £2,868. 4*s.* 6*d.* per annum, payable by the Company	34,044	16	10
Proprietors' fund	121,524	0	0
Surplus fund	213,709	4	9
Total	£1,782,408	12	11

"'From the foregoing statement it will be seen, that after making allowance for every ascertained claim and for every possible liability and contingency, there remains a gross surplus of £213,709. 4*s.* 9*d.*; and of this sum I would beg to recommend that £60,670 be appropriated to the purposes of the present division, the remaining £153,039. 4*s.* 9*d.* being left, with its accumulations, to go in aid of the fund for future additions or reductions of premiums, &c.

"'The allotment of this portion of the surplus will entitle the proprietors to a bonus of 10 per cent., or 10*s.* per share, making, with the dividend now falling due, 15 per cent., or 15*s.* per share.

"'The policy-holders, on the other hand, will get in present value the sum of £48,536, about equivalent to a reversionary addition of £120,000 to the sums assured. The share of each of the assured in this aggregate addition will be ascertained with the utmost despatch; but since it will require upwards of 35,000 distinct calculations to determine it, and its value under the proposed forms, some considerable time must necessarily elapse before the whole can be completed. The average addition will, however, be not far from 28 per cent. on the premiums paid since the division in 1847.

"'It may perhaps gratify curiosity, to mention that the average of the principal items of account during the five years has been as follows:—

	£.	s.	d.		£.	s.	d.	
New premiums	5,932	0	2	or	29,695	1	0	in all.
Renewal ditto	90,124	15	2	"	450,623	15	10	"
Interest	30,786	12	0	"	153,933	0	1	"
Claims	68,429	19	8	"	342,149	18	7	"
Surrenders	4,003	11	3	"	20,017	16	5	"
Expenses	5,771	0	9	"	28,855	4	1	"

"'Also, that of the assets of £738,884. 17*s.* 11*d.* reported by the Auditors,

£.	s.	d.			Per Annum. £.	s.	d.		Per Cent. £.	s.	d.
240,708	7	4	is invested in life interests .	paying	13,356	17	5	or	5	11	0
233,729	11	5	is invested in mortgages . .	„	10,233	12	5	„	4	7	7
215,282	18	2	is invested in Government securities	„	6,818	12	3	„	3	3	4
12,007	1	0	is invested in reversions . .	„	480	5	8	„	4	0	0
37,157	0	0	at the time unproductive.								
738,884	17	11			30,889	7	9	or	4	3	7

"'The total yielding an aggregate interest of £30,889. 7*s.* 9*d.*, or £4. 3*s.* 7*d.* per cent. on the average.

"'I have the honour to be, gentlemen, your very obedient servant,

"'C. JELLICOE.'

"Such gentlemen, is the promising condition of the Company's affairs, as reported by your auditors and actuary, and most carefully and minutely verified by your directors. They congratulate you upon it, as fulfilling your previous anticipations, and amply justifying the wisdom and prudence of the step which in 1847 you were induced to take.

"Adopting, then, your actuary's recommendation, with reference to the present division (the soundness and propriety of which your directors have fully satisfied themselves of), the bonus payable to you on this occasion will, as already stated, be at the rate of 15 per cent., or 15*s.* per share, the current dividend included, and this you will receive, free of income tax, on and after the 4th day of October next.

"As regards the portion to be distributed amongst the assured, your directors have for some time past had under their consideration a more satisfactory mode of dividing it, and they have determined, as being more consistent with their existing regulations, and with the facilities now so generally afforded, to allow the assured to participate after paying five annual premiums, instead of requiring the previous payment of eight as heretofore, and to give them four options instead of two only, from which to select a mode of receiving their share of the surplus: that is to say, they propose that it shall be had either in cash, in reduction of the five annual premiums next payable, in reduction of all the premiums payable thereafter, or, lastly, by way of an addition to the sum assured. Your directors further propose that a proportionate addition shall be made for the interval between any given division and the time of the decease of the lives assured, and thus by these arrangements the policy-holders will be in precisely the same position as if a valuation were made and the surplus distributed every year, instead of quinquennially. In other words, those who are entitled to participate will begin to do so at the end of the first five years, or just before the sixth annual premium becomes due, and will then, in effect, continue to do so every year until that in which the decease of the life assured shall occur."

In reply to a proprietor it was stated, that the general fund, which was now £738,000, was about £493,000 in 1847; and that the number of proprietors was 900.

The Economic Life Assurance Society.—Report for 1850.—The receipts, including a balance of £5,850. 3*s.* 6*d.*, consisted of £129,076. 4*s.* 3*d.* for assurance premiums, £47,624. 9*s.* 3*d.* for interest on investments, £25,296. 8*s.* 1*d.* investments paid off, and £3,249. 13*s.* 9*d.* claims on reversionary interest; making a total of £211,096. 18*s.* 10*d.* The pay-

ments during the past year, on assurance claims, annuity claims, investment in Government securities, investments in mortgages, loans on policies, purchasing of policies, rent, taxes, directors' remuneration, actuary, secretary, and all other incidental expenses, amounted to £202,424. 8*s.* 3*d.*, leaving a balance of £8,672. 10*s.* 2*d.* The statement of the assurance fund was as follows:—Funded property in Government securities, £433,039. 19*s.* 4*d.*; mortgages, £498,784. 11*s.* 7*d.*; life interest and reversionary, £108,311. 17*s.* 11*d.*; cash in hand, £8,672. 10*s.* 2*d.*; making a total of £1,048,808. 19*s.*

A report was read from the auditors, stating that the accounts had been carefully examined, and found to be in every way most satisfactory. The chairman said that after paying all claims out of the premiums for the past year, there would remain to be carried to the credit of the Company a sum of £57,000, and from the total income arising from premiums and interest investments there would be a balance of £100,000. The actuary stated that the claims which accrued in 1849 amounted to £67,500, and the sum paid to £40,500; in 1850 the claims accrued were £53,800, and paid £76,700, the amount having been increased by claims which had previously accrued, but which had not been paid until last year. The progress this Company had made during the past year was as follows:—They had received £11,736 on new premiums, and £123,107 for renewals, and had remitted bonuses to the amount of £2,536; making the total amount for the past year £138,000. There had been 653 proposals, and 527 policies issued; 50 accepted, but not completed, and 76 declined. The amount assured for was £350,000. The total sum paid in claims and bonuses amounted to £62,500. During the last year they might naturally have expected, from the lapse of lives, claims amounting to £87,660, whereas the amount actually paid was only £62,500, which was an evidence of the system of caution evinced in the management of this Company. The number of policies now in force was 5,748, and the amount of risk £4,683,989; producing an income of £138,654. During the past three months they had issued 130 policies, and received in premiums £3,500. He might mention another fact to illustrate the soundness of the principles adopted by this Company. Owing to the lapse of 12 policies, claims had fallen on their funds to the amount of £13,500, upon which policies they had actually received £13,481.

The sum of £140 was then unanimously voted to the auditors for their services during the past year. The retiring auditors were re-elected; and after a cordial vote of thanks to the chairman, the meeting separated.

The Economic Life Assurance Society.—At the annual general court of this Society, held March 19, 1853, the secretary read the following statement of accounts for the year 1852:—"On the receipt side: Balance, auditors' report, 11 Feb., 1852, £21,110. 4*s.* 11*d.* Assurance premiums, £146,594. 10*s.* 5*s.*; less commission, £4,766. 10*s.* 8*d.*; net, £141,827. 19*s.* 9*d.* Interest on investments, less £1,494. 1*s.* 7*d.* for income tax, £50,486. 13*s.* 6*d.*; investments paid off, £246,555. 7*s.* 1*d.*; total, £459,980. 5*s.* 3*d.* Under the head of disbursements were the following:—Assurance claims, including bonuses, £100,721. 9*s.* 6*d.*; annuity claims, £557. 11*s.* 4*d.*; investments in Government securities, £153,788. 15*s.*; ditto mortgages, life interests, and reversions, £172,057. 0*s.* 8*d.*; loans on policies, £6,480; purchase of policies, £4,923. 1*s.* 6*d.*; reassurance premiums, £513. 12*s.* 5*d.*;

rent, taxes, insurance, and repairs, £982. 11*s.* 4*d.*; printing, advertisements, stationery, and stamps, £981. 8*s.* 10*d.*; directors, auditors, and medical officers, £2,131. 7*s.*; actuary, secretary, and clerks, £2,613. 5*s.* 6*d.*; agents' charges and medical fees, £355. 15*s.* 6*d.*; solicitor and law expenses, £270. 17*s.* 7*d.*; income tax, £134. 0*s.* 5*d.*; sundries, for house and office expenses, porterage, parcels, messenger, and other small disbursements, £431. 4*s.*; balance in hand, £13,038. 4*s.* 8*d.*; total, £459,980. 5*s.* 3*d.*"

The secretary also read the following account of the assurance fund:—"Funded property and Government securities, £620,818. 15*s.*; mortgages, £454,071. 5*s.* 1*d.*; life interests and reversions, £133,724. 17*s.* 6*d.*; cash in hand, £13,038. 4*s.* 8*d.*; total, £1,221,653. 2*s.* 3*d.*; from which was deducted £1,128. 10*s.* 6*d.* for two shares and dividends unclaimed, leaving a net assurance fund of £1,220,524. 11*s.* 9*d.*"

The auditors, in their report, stated that they had examined the accounts of the Society for the year and had found them correct; they also expressed their satisfaction in being able to state that there was a sum of £3,036. 15*s.* only due in respect of interest on investments.

The chairman moved the adoption of the report, which was seconded.

In reply to questions, the actuary said the number of proposals made during the year was 654, the number of policies issued 543. 52 proposals were accepted but not completed, and 59 were declined. The premiums on account of the new assurances during the year amounted to £13,384. 6*s.* 1*d.* The amount for renewals was £134,252. 12*s.* 6*d.*; for commutation of premiums, £126. 8*s.* 1*d.*; for life premiums combined with life interest, £806. 11*s.* 8*d.* There had been remitted as bonuses, which would otherwise have been received as premiums, £2,283. 11*s.* 3*d.*; making the total receipts for premiums £150,853. 9*s.* 7*d.* The 543 policies issued during the year covered £402,969, the average amount of the new policies being £745. The claims which had accrued by deaths during the year were on account of 116 policies, assuring an aggregate of £77,116. On these policies the absolute bonuses were £7,730, the contingent bonuses £2,243, and the conditional bonuses £566. 10*s.*; making the total amount of the bonuses £10,539, and the total amount of the claims with the bonuses £87,655. The total number of policies in force on the 31st of December, 1851, was 5,950; to which were to be added 543 for last year, and, after deducting 235 policies which had gone off in the interval, there remained 6,258 in force at the end of last year. The total amount assured was £5,097,113, the average of the existing policies being £819.

The report and accounts were adopted unanimously, and the auditors re-elected.

INSTITUTE OF ACTUARIES.

We have on former occasions (see pages 101 and 195, vol. ii. of this Journal) adverted to the desirableness of using every means for the more perfect and extended cultivation of the science upon which the actuarial profession is based; and we therefore with pleasure insert the following plan (sketched by a Member of Council, well versed in such matters) for the establishment of a Mathematical Professorship in connection with the

Institute, hoping that the publicity thus given to it may lead to steps being taken for its eventual realization.

Article I. That although the actuarial and secretarial functions are not incompatible with each other, and are often therefore jointly and usefully exercised by the same person, yet that it thereby becomes the more important to publicly indicate, in a plainer form than has hitherto been done, the distinguishing characteristic of actuaries, by establishing a Mathematical Professorship, in immediate connection with their own Institute, as especially typical of a society of scientific calculators rather than of correspondents.

II. That it should be the duty of the holder of such a Professorship to deliver a course of not less than twelve lectures during each session, on such branches of mathematics as might be most likely to interest the profession, without being so wholly of a technical character as to be unattractive to mathematicians in general.

III. That it should also be the duty of such a Professor to contribute not less than two papers per annum to the Journal of the Institute.

IV. That member-tickets to the lectures, at one guinea the course, should be obtainable on application to the Treasurer or Honorary Secretaries, by all such Fellows and Associates as should express themselves desirous of upholding the Professorship.

V. That non-member-tickets, at two guineas, should be obtained at the booksellers by all such strangers as the public advertisement of "Mathematical Lectures" by a Professor of repute might induce to attend.

VI. That the Professor should be guaranteed an honorarium of £ for each course, half of such sum to be payable one month previous to the first lecture, and the remaining half, with such an additional honorarium as circumstances might justify, one month after the concluding lecture.

VII. That the Professor should be requested to take into his consideration the possibility or otherwise of establishing an instruction class for such Associates as might be preparing for their examination, and willing to pay such fees to the Professor as might be deemed fit and proper; and also whether an account should not be kept of the attendances of each Associate upon such a class, as collateral evidence for the Examiners of a desire or otherwise to acquire the requisite mathematical proficiency.

As connected with the subject, we append the questions put before the candidates at the last examination, not on the score of their importance, but as affording useful information to the younger members of the Institute.

Matriculation Examination, 1852.

1. Divide $\frac{4}{9}$ of $\frac{5}{7}$ by $3\frac{4}{12}$.
2. What is the value of $\frac{3}{21}$ of £1?
3. Express the foregoing value by a decimal fraction of a pound.
4. Referring to the questions 2 and 3, how is it that the expression for the value in the one case is finite and in the other infinite?
5. Referring as before, how much is the decimal value short of the fractional one?
6. What is meant by the logarithm of a number?
7. What are the chief properties of logarithms?
8. If the logarithm of 10 be 1, within what numerical limits will the logarithms of numbers between 100 and 1000 be?

9. What index will the logarithm of the fraction ·6375 have in the same system?

10. Find by logarithms the fifth root of 4·44.

11. Given $\left\{\begin{array}{l}\dfrac{x+y}{3}+1=6\\[2ex]\dfrac{x-y}{7}+3=4\end{array}\right\}$ to find x and y.

12. Prove that, if one fraction be equal to another, the sum of the numerator and denominator divided by their difference, or their difference divided by their sum, for the one, is equal to the like for the other, that is—

$$\text{If } \frac{m}{n}=\frac{p}{q}, \text{ then } \frac{m+n}{m-n}=\frac{p+q}{p-q}, \text{ and } \frac{m-n}{m+n}=\frac{p-q}{p+q}.$$

13. In the general quadratic equation $x^2+px+q=0$, under what conditions will the two values of x be equal to each other?

14. If m and n be the two values of x in the above equation, show that $m+n=-p$ and $m.n=q$.

15. There are three numbers in geometrical progression whose product is 216, and sum 21. What are the numbers?

16. Show that the sum of the series

$$\frac{1}{m.(m+r)}+\frac{1}{(m+r).(m+2r)}+\frac{1}{(m+2r).(m+3r)}+\text{ \&c., } ad\ infin.,$$

is equal to $\dfrac{1}{mr}$.

17. If the series $a+ar+ar^2+$, &c. be continued *ad infinitum*, show that the sum of it becomes equal to $\dfrac{a}{1-r}$ when r is a proper fraction.

18. How many permutations can be formed of n things taken two and two together?

19. Why is the number of combinations which can be so formed out of n things only half the number shown in the answer to the foregoing question?

20. Prove that the number of permutations of n things, taken all together, is equal to $1.2.3.4....n$.

21. Prove that the number of combinations of n things, taken m together, is equal to $\dfrac{n.\overline{n-1}.\overline{n-2}....(n-m+1)}{1\quad 2\quad 3\ .....\ m}$.

22. What is the object of the Binomial Theorem?

23. Expand $(1+x)^n$.

24. Find the sum of all the coefficients of an expanded binomial.

25. Show by actual addition the succeeding terms of a series, the first of which is u, and the successive differences of whose terms are du, d^2u, d^3u, d^4u, &c.

26. Point out the analogies which lead us to infer that for the nth term we may write $u_n=u+ndu+\dfrac{n(n-1)}{1.2}d^2u+$ &c., and for the nth difference, $d^nu=u_n-nu_{n-1}+\dfrac{n(n-1)}{1.2}.\ u_{n-2}-$ &c.

27. Show that, if a side of any triangle be produced (1) the exterior angle is equal to the two interior and remote angles, and (2) the three interior angles of every triangle are together equal to two right angles.

28. Show that in any right-angled triangle, the square which is described upon the hypothenuse, that is, the side subtending the right angle, is equal to the squares described upon the sides which contain the right angle. When the sides of a right-angled triangle are 30 and 40, what is the hypothenuse?

29. Show that, if a straight line fall upon two parallel straight lines, (1) it makes the alternate angles equal to one another; (2) the exterior angle equal to the interior and remote upon the same side; and (3) the two interior angles upon the same side together equal to two right angles.

30. Draw through a given point between two straight lines not parallel a straight line which shall be bisected in that point.

PROCEEDINGS OF THE INSTITUTE.

First Ordinary Meeting, Session 1852–53.—*Monday, 29th November*, 1852.

JOHN FINLAISON, Esq., President, in the Chair.

The President opened the Meeting with an address, in which he reviewed the progress of the Institute, now entering on its *Fifth* Session.

The Minutes of the last Ordinary Meeting were then read and confirmed.

The Secretary announced numerous valuable donations to the Library.

The Right Honourable Lord Overstone was elected an Honorary Member of the Institute.

The following Candidates, duly nominated at the last Meeting, were elected Associates of the Institute, viz.:—

Henry Tompkins. | J. A. Bird.

The following papers were read, viz.:—

"On Formulæ for Obtaining the Values of Policies, at an Intermediate Period of the Year." By James Meikle, Esq.

"On the Life Assurance Companies of Germany; their Constitution, Condition, and Prospects." By Herr Rath G. Hopf, of Gotha. Translated from the German by Samuel Brown, Esq.

"On the Insurance Companies of Austria." By Herr S. A. Daninos, of Trieste. Translated from the French.

Second Ordinary Meeting, Session 1852–53.—*Monday, 27th December*, 1852.

JOHN FINLAISON, Esq., President, in the Chair.

The Minutes of the last Ordinary Meeting having been read and confirmed, the Secretary announced several donations to the Library.

The President announced the result of the First or Matriculation Examinations, by which it appeared that of eleven Associates who had come forward in London, ten had passed, the first five with great credit as placed, viz.:—

George Scott. E. H. Galsworthy.
William Beverley.
J. B. Haycraft. Thomas Carr.

John Coles. | J. P. Lawrence.
Edward Cutbush. | Charles Watkins.
Charles Griffiths. |

And that six Candidates had offered themselves for examination in Edinburgh, and had all passed; their names appearing in the following order of merit, viz.:—

D. R. W. Huie.	C. M. Martin.
Thomas Miller, Jun.	James Wilson.
D. C. Smith.	A. G. Ramsay.

The following Candidates, duly nominated at the last Ordinary Meeting, were elected Associates of the Institute, viz. :—

R. Browne.	W. M. Makeham.
Thomas Brown, Jun.	Thomas Miller, Jun.
C. G. Fothergill.	H. T. Mills.
E. H. Galsworthy.	W. P. Pattison.
J. T. Hamerton.	George Scott.
A. J. Knight.	

Mr. Jellicoe, V.P., read a paper "On the Objectionable Character of certain Methods, very generally practised, for Determining and Dividing Surplus in Life Assurance Companies."

Third Ordinary Meeting, Session 1852–53.—*Monday,* 31*st January,* 1853.

W. T. Thomson, Esq., V.P., in the Chair.

The Minutes of the last Ordinary Meeting having been read, the Secretary announced several valuable donations to the Library.

The following Candidates, duly nominated at the last Ordinary Meeting, were elected Associates of the Institute, viz. :—

Official Associate—Richard Ray.

Associates.

Walter Brown.	J. G. Hooton.
J. Foot.	George Stephenson.
C. W. Gibbon.	Edwin Sympson.
John Gill.	James Terry.

A discussion on Mr. Jellicoe's paper took place, in which Mr. Pinckard, Mr. Reddish, Mr. Jenkin Jones, Mr. Hodge, Mr. Farren, V.P., the Chairman, and Mr. Lodge, bore part; and Mr. Jellicoe having replied, the Meeting adjourned to Monday, 28th of February.

(For heads of discussion see *Athenæum*, February 19th.)

Fourth Ordinary Meeting, Session 1852–53.—*Monday,* 28*th February,* 1853.

Charles Jellicoe, Esq., V.P., in the Chair.

The Minutes of the last Ordinary Meeting having been read and confirmed, the Secretary announced various donations to the Library.

The following Candidates, duly nominated at the last Ordinary Meeting, were elected Associates of the Institute, viz. :—

Official Associate—S. L. Laundy.

Associates.

George Adams.	James Muir.
John Craig.	R. S. Price.

The special thanks of the Meeting were voted to Mr. Thomson, V.P., for his kind present of 200 copies of Mr. Sang's "Essay on Life Assurance," which had been distributed among the Members of the Institute resident in London.

Mr. Hardy, V.P., read a paper entitled "An Exposé of the Fallacy 'That it is Just to Tax Temporary Annuities at the same rate as Perpetual Annuities.'"

A discussion ensued, in which Mr. Hill Williams, Mr. Farren, V.P., Mr. Hodge, Mr. Farr, Mr. Lodge, Mr. Hardy, V.P., and the Chairman, took part.

(For heads of discussion see *Athenæum*, 5th March.)

THE

ASSURANCE MAGAZINE,

AND JOURNAL OF

THE INSTITUTE OF ACTUARIES.

On the Theory of Progressive Mortality, and its application to Valuations. By JAMES MEIKLE, ESQ., *of the Scottish Provident Institution, Edinburgh.*

[Read before the Institute 25th April, 1853, and ordered by the Council to be printed in abstract.]

IN this paper, Mr. Meikle advocates the making of valuations by Assurance Companies, not solely in accordance with the actual mortality which may have prevailed, but on the basis of that which it was at first assumed would prevail. He says, "There is inherent, in every table of net annual premiums, a rate of mortality and rate of interest, which it is assumed will be those experienced by the Office; and books and accounts should be so formed as to show at any time to what extent the assumed rates of mortality and interest have come up to the rates experienced, and, by comparing the expected receipts and disbursements with the actual receipts and disbursements, a correct view would be given of the true position of the Office." He then proceeds to point out what he considers the best methods of estimating the "expected mortality," and of registering it and the actual mortality from year to year, and gives tables by way of illustrating such methods.

In the second part of his paper the author treats of the monetary results arising from such a system as that which he advocates, and, making certain assumptions as to the number of lives assured, &c., shows the amounts of liability and surplus which would appear under the assumed experience, as compared with those which would

obtain under the actual—which he always regards as subject to the effects of "suspended mortality."

The following extract from his paper will tend to throw further light on the author's views, and also serve as a specimen of the style in which the paper itself is written:—

"In valuations, it seems most desirable that the decrements of life indicated by the table should be preserved, and that actual decrements be unheeded, because the temporary variations of life from the tabular decrements may give rise to pecuniary results of a very large extent, differing very materially from the results which were assumed and provided for by the premiums. The nature, too, of an ordinary assurance by annual premium, forces this upon our earnest consideration. The exact times when the lives will die are fixed by the mortality table used, and at these times the sums assured will be supposed by that table to be due and payable, and will certainly be thrown into the funds for that purpose. They will ripen of their own accord; and unless they are withdrawn from the funds by the actual emergence of the life, will, at a valuation proceeding upon those actually alive, stand upon the asset side as a surplus of funds, less the value of the policy, but which is a mere trifle in comparison, especially upon recently opened policies.

"But I hold that all the profit realized by Assurance Offices proceeds from the following sources, viz.:*—

"1st. The interest on the sums assured, from the period of becoming due by the bills of mortality, until the date of payment by the actual death of the life assured; and, 2nd, from the accumulated premiums received during that period.

"Seeing that it is impossible for the Office to base its premiums upon its own experience (and were that possible there would be no profit), I think that the next most wise step is to base the premiums upon the table which has been compiled from the experience of a similar class of lives (not the population), and to abide by that table throughout the existence of the Office. The actual mortality will not ultimately differ so very materially from that assumed as to occasion regret. There may be a temporary variation during the earlier years of the Office, but if the lives of any one year of entry be observed during a course of years, they will be found to approach very closely to that table assumed. The greatest variation will appear

* I exclude an increase in the rate of interest above the assumed rate, because whatever is *received* will appear of itself as *extra* funds, while the suspended mortality is a sum not paid which was calculated to be paid.

upon lives recently assured, and is, of all others, most likely to lead the unwary actuary astray; and to obviate this is the express tendency of the present paper.

"I do not see that there will be any difference of opinion upon the preceding sources of profit of an Office. It may, indeed, be held that it is sufficient for the Office to retain in its possession the value of each of its policies; but in answer to this, I think it may be affirmed that, as the ultimate amount of profit in each case will be the same, it will be more prudent and more cautious to adopt the safer valuation, which will show less profit during the earlier years. For if the variation of the mortality table be merely temporary—say, for one year—and the surplus appearing in consequence be withdrawn, and the experience return to the original table, there will then be a deficiency of funds. Again: should a deficiency arise from an increased mortality, and consequent withdrawal of the sum assured for a year or two before the original data had matured the assurance, the amount of this deficiency would, by the prospective method of valuation, be the sum assured, its interest, and loss of premiums.

"Now I reckon that this is likewise wrong. The sum assured, although paid one or two years before its calculated date, cannot form a deficiency, but only that which is lost *in consequence* of its having been paid before its proper time; viz., interest on the sum so paid, and the premiums *not* received, with interest, which were expected to have been received before the assurance became due. In the same way, that only is surplus which is received in the shape of interest on the assurance lying in the Office funds until called for, and the accumulated premiums received over and above the number originally calculated to be received previous to the calculated emergence of the claim.

"It seems most desirable, therefore, to arrive at such a method of valuation as will retain the original data throughout the existence of the Office. The prospective method is based upon the actual number of the members in existence at the date of valuation, and therefore will exhibit as surplus the sums assured of those members who have not died, but were calculated to die (less the values of their policies), over and above the surplus which would be brought out by the retrospective method, which is based, at *every valuation, upon the original number of entrants;* and proceeds upon the assumption that the mortality experienced coincides with the original data, and therefore any surplus brought out by it will be from interest on the claims till paid, and the accumulated premiums received during

the prolonged life of each of these members. There is great risk in appropriating the one surplus, but none whatever in appropriating the other. The retrospective method, therefore, is more safe to the Office, more just to the members individually, and more equitable to all, and is the method which ought to be universally adopted."

Concerning the Renewal of Leaseholds for Lives or Years that have been the subject of Settlement. By C. J. Bunyon, Esq., M.A., F.I.A., *Barrister at Law.*

[Read before the Institute 30th May, 1853, and ordered by the Council to be printed.]

When the entire ownership of renewable leaseholds for lives or years is vested in one person, common prudence dictates the setting aside of a portion of the annual income towards the payment, in the one case of the premiums of a policy upon the lives of the cestuis-que-vie, or, in the other case, to accumulate at compound interest, so as to form a fund for the future renewal, the amount reserved being proportionate to the length of the term. When, however, such a property has been settled, and successive interests have been carved out of it, if there is no separate fund provided for the purpose, questions arise between those entitled for life and in remainder, whether there is in the particular case any obligation to renew at all, and, in the event of renewal, by whom the expense is to be borne. In such cases the first point to be considered is, what are the provisions of the instrument by which the leaseholds are settled—whether they prescribe renewal expressly or by implication; and if so, whether they point out the mode by which the expenses of the renewal are to be paid: for (1), property of this description may be given in such a mode as to indicate that it was not intended to impose any obligations to renew; and (2), the donor or settlor may so model his dispositions as to throw the burden upon all or any of those in whose favour he has created limitations of the estate; or (3), he may expressly charge the renewals upon the annual income, to the intent that they may become as it were incidents to the estate, prior to any beneficial enjoyment by the objects of his bounty; or (4), upon the corpus, with the intent that the estate should be settled subject to the subordinate direction that it is to undergo a perpetual diminution, with a view to its being otherwise preserved.

The directions of the settlor are of course invariably to be followed; but great difficulty continually arises, more particularly when the settlement is testamentary, in determining what construction is to be given to them; whether any particular provision is intended, or the questions to arise are left to the general rules of equity to determine.

Where, in any of such cases, the leasehold is for lives and not for years, recourse to insurance appears equally desirable, and has been repeatedly approved by the Court, with the consent of the parties; it may however hereafter become a matter of grave consideration, whether such a course, instead of being simply permitted, is not to be adopted as the rule of courts of equity in all cases where any such obligation is imposed, except in those in which the parties taking subject thereto prefer becoming their own insurers, giving independent securities for their ultimate liabilities.

It must be observed that the tenant for life is not bound to renew, except, from the terms of the will or the nature and formation of the gift to him, you can imply an intention that he should do so.* But when there is no obligation to renew, and the tenant for life thinks proper to do it, the Court considers such renewal to be made for the benefit of those entitled as well in remainder as in possession, and will not allow him to renew for his own exclusive benefit; but, in like manner, it attaches a further equity upon the transaction in his favour, considering what are the obligations of the party claiming the benefit of the renewal to the author. It will then interfere to apportion the expenses between the tenant for life or his estate and the remainderman (which it does in this case, as where there is a mere direction to renew with no indication of intention as to the mode in which the fine is to be raised), in proportion to their respective interests in the estate.

When the tenant for life is under no obligation, and declines to renew, the remainderman may do so at his own expense and for his own benefit;† but should he do so without the express refusal of the tenant for life, it may be presumed that he would be considered as doing so for the benefit of the estate, and would be entitled to contribution from the tenant for life if the latter subsequently assented to the arrangement or derived any actual benefit.

* White *v.* White, 9 Ves., 561. Capel *v.* Wood, 4 Russ., 500. See Mountford *v.* Cadogan, 19 Ves., 635. Lawrence *v.* Maggs, 1 Ed., 453.

† White *v.* White, *supra.*

In like manner, if the fine is raised by a mortgage of the estate, and, upon the true construction of the settlement, is not to be considered a charge upon the corpus, the remainderman will be entitled to contribution against the estate of the tenant for life;* and if the lease is not renewed by the tenant for life, where he is charged with the renewal, the remainderman is considered entitled to compensation out of his assets.†

We shall now consider some cases in which the intention of the testator was held apparent upon the will.

The Earl of Shaftesbury *v.* the Duke of Marlborough‡ is a case in which particular interests were considered charged by a testator. Leaseholds for lives were devised to trustees upon trust out of the rents and profits of such leaseholds to renew them, and subject to such trust they were limited to accompany large freehold and copyhold estates in strict settlement; and it was held, on the construction of the will, that the tenant for life and all other persons in remainder who should be successively in possession were bound to sustain the expenses of the renewals becoming necessary during their several periods of enjoyment; and on payment over to an encumbrancer of the tenant for life of the balance of the rents and profits, a provision was required, of a fund for securing the payment of fines and expenses of future renewals, in the event of their occurring in the lifetime of the tenant for life, which was done by insuring his life against that of each of the lives on which the leases were held. Not only was the income accruing from the leaseholds during the life of the tenant for life subject to these payments, but it was considered that the trustees might have paid them out of the general income of the whole devised estate; which leads to the remark, that such an interest as is now under consideration may, as well as any other property, be devised subject to a condition which may in fact be more onerous than the value of the interests given may be beneficial, in which case the devizees will be bound to elect either to bear the burden or to renounce any interest under the will.

The case of Stone *v.* Theed || is one in which the charge was considered to be upon the rents and profits as they annually accrued, and excluding the common construction, that a charge upon or gift of the rents and profits is equivalent to a charge upon or gift of the corpus. It was likened to the case of an estate requiring

* Lord Milsintown *v.* Lord Portmore, 3 Madd., 491. 5 Mad., 47.

† Colegrave *v.* Manby, 6 Madd., 72. 2 Russ., 238. Bennett *v.* Colley, 2 M. & K., 225.

‡ 2 My. and Keen, 111. || 5 Hare, 451, *in notis.* 2 B. C. C., 243.

an embankment to be kept up to protect it, in which case the expense of keeping up the embankment would be a primary charge upon the income. The successive tenants for life were then made chargeable, on renewals taking place in their respective lives, in each case to the full amount of the receipts past and prospective of the particular tenant.

When the amount of the fines was to be raised out of the rents and profits, *or by sale* or mortgage, it was considered that the expenses of renewal were primarily charged upon the corpus, and the tenant for life was not bound to contribute to the payment of the principal of a sum raised by mortgage on the estate, but only to keep down the interest.*

The directions to raise sufficient sums out of the rents and profits or by mortgage have been considered not to indicate any particular mode of charging those entitled to the income.

In such cases, as where there is a bare direction to renew, the general rule of the Court is applicable. In forming this rule there were obviously two courses to be adopted, namely: that provision should be immediately made for the gradual creation of a fund to meet future renewals; or that provision should be made as the occasion arose, the expenses thereupon being borne by the then tenants for life and in remainder in proportion to the benefits derived by them from the renewal. The first course has at first sight much to recommend it, since the property would thus always remain in the condition in which it was devised by the testator, namely, unencumbered, and subject only to the charge of the renewals; but it is open to this objection, that there does not appear to be any fixed principle upon which the tenant for life is to be charged before a renewal becomes necessary, more particularly when the lives are old and deteriorated; and it may be dismissed as having never been adopted. The theory on the contrary appears to be, upon each renewal to look upon the property (that is, the further term or interest) as about to be purchased for the benefit of the settlement, and then to consider in what way the fine for renewal is to be borne.†

In the absence of any express direction, it has been always held that the Court would raise the necessary funds by a mortgage of the estate, or would apply any other funds subject to the like limitations; but some time elapsed before anything like an equitable rule was laid down as to the proportions in which the money

* Playters *v.* Abbott, 2 My. & K., 97.

† Jones *v.* Jones, 5 Hare, 463. Huddleston *v.* Whelpdale, 9 Hare, 485.

raised was to be ultimately borne. At one time it was thought sufficient that the tenant for life should pay the interest of the mortgage; at another, that he should pay a third, and the remainderman two-thirds, of the fine; but such rules were obviously absurd, and are exploded. It is now clearly settled, that each party is to pay in proportion to the benefit he actually or *de facto* derives from the transaction.*

It is, however, easier to lay down abstract principles of justice than to apply them; and in this particular instance great difficulty has been felt in practice in the application of the rule, which may be considered to have been settled by Lord Thurlow in an early case, when the leasehold was not for lives but for years.

In this case† a tenant for life, not bound to renew, renewed a term of which there were 12 years to run for a further term of 28 years, and died at the expiration of 9 years from the commencement of such further term. The question was as to the sum in which her estate should be recouped by the remainderman. "The Master," observed the Court, "should take the sum paid by her for the renewal of the lease as the value of the term purchased—that is, of the term of 28 years, to commence at the expiration of 12 years. He should then consider the value of the term of 9 years after the existing term (viz., the 12 years), and what the term of 19 years after the existing term and the 9 years was worth; and the latter is the proportion of the fine actually paid to be borne by the remainderman: and on such sum he directed compound interest at 4 per cent. to be calculated.‡

Here there is an intelligible rule as regards leaseholds for years. The tenant for life is considered as purchasing at the time of the

* White *v.* White, 9 Ves., 558. † Nightingale *v.* Lawson, 1 Bro. C. C., 440.

‡ In such a case, in whatever manner the fine may have been fixed, the problem will be solved by ascertaining the actual rate of interest at which the purchase was made, and thence the proportions in which it is to be borne.

If l = the existing term,
m = the further term,
n = the part of m enjoyed by the tenant for life,
I = the net income of the estate,
F = the fine,
x = the interest for £1 for one year at the required rate;

$$F=\frac{I}{x(1+x)^l}\left(1-\frac{1}{(1+x)^m}\right)=V_t+V_R,$$

when V_t = the amount to be paid by the tenant for life, and V_R = the amount to be paid by the remainderman. From the above formula the value of x may be found by approximation, and thence V_t and V_R; for

$$V_t=\frac{I}{x(1+x)^l}\left(1-\frac{1}{(1+x)^n}\right), \text{ and } V_R=F-V_t.$$

renewal a reversionary term, equal to that which he actually enjoys, and the residue of the fine is to be borne by the remainderman.

How then is the rule to be applied to leaseholds for lives? There appear to be four ways. The first by insuring the life of the new cestui-que-vie for the amount of the fine, and compelling the tenant for life in possession to keep down the interest and pay the premiums upon the policy; the second, by estimating the probable benefit derived by the tenant for life or successive tenants for life and remainderman by the addition of the new life, and dividing the fine in such proportions; the third, by waiting until the death of the tenant for life, and then estimating the proportions according to the result then experienced; and lastly, by waiting until the lapse of the additional life, and estimating the term thereby gained as if an absolute term.

Of these four methods the first alone recommends itself as possessing both simplicity and perfect justice. The burden of the fine is imposed upon the income during the term of the life of the new cestui-que-vie, and is borne by the recipients of that income in exact proportion to their receipts. It is also equally easy of application, however numerous the successive tenants for life.

The second is equally fair, but is liable to the objection that by it the parties paying the respective proportions of the fine undertake the office of an Insurance Company. For example: the tenant in remainder at once bears a proportion of the fine, although he may in the result either derive no benefit, or at least only the benefit of a subsequent renewal upon more favourable terms, or may be benefited to a much greater extent than the value of the fine paid by him. It is also open to this further objection—that if the amounts to be respectively paid are to be calculated upon mathematical principles, they cannot be correctly ascertained except upon the assumption that the life of the tenant for life is insurable upon the ordinary terms; that is, that he is in a state of health sufficiently good to make his expectation of life equal to that indicated by the tables at the age which he has attained: for if he is not so, although an approximation to the truth may be obtained in a case of chronic malady by assuming him to be of a higher age, yet such an assumption is altogether arbitrary, and in the case of a confirmed and incurable disease seems to be altogether inapplicable. The new cestui-que-vie is of course always a healthy life.*

* Let F = the fine, A B and C be the three lives aged respectively 50, 60, and 20 years, C being the new tenant for life; let T be the tenant for life, aged 40 years; denote annuities on their lives and joint lives by a_{50}, b_{60}, c_{20}, $a_{50}c_{20}$, $a_{50}b_{60}c_{20}$:

The first plan was adopted in the case of Greenwood *v.* Evans,* but by consent; the second in an earlier case,† in which it was referred to the Master to ascertain what proportions should be borne by the tenant for life and in remainder, and the decree was acquiesced in (but it does not appear upon what principle the Master's report was made); and again, in the case of Reeves *v.* Creswick,‡ in which the principle upon which the Master's report was made is clearly and accurately laid down. In that case the testatrix devised leases for lives to a married woman for her life, with remainder to her children absolutely. Upon the decease of the testatrix one of the cestuis-que-vie alone remained; and, the children being infants, a bill was filed by the trustees, to obtain the sanction of the Court to a mortgage of the property, and its direction as to the apportionments of the charge between the tenants for life and the persons entitled in remainder. The assistance of the actuary of an Assurance Office was called in, to ascertain the relative proportions. It was considered that, the period of enjoyment of the property by the tenant for life under each of the old leases being the joint duration of her own life and that of the then surviving cestui-que-vie named in such lease, and the period of her enjoyment of the property under each corresponding renewed lease being in like manner the joint duration of her life and those of the new cestuis-que-vie, or the longest liver of them, the difference between the values of the estates for these two periods gave the benefit derived by the tenant for life from the renewals in question. The residue of the increased value of the property necessarily expressed the benefit derived from the renewals by the children in remainder. The relative proportions being thus ascertained, it was directed that a policy should be effected upon the life of the tenant for life, for the

let I = the net income, x = interest of £1. for one year, F = the fine as before
Then, supposing the fine accurately calculated by the tables,

$$F = I(c_{20} - a_{50}c_{20} - b_{60}c_{20} + a_{50}b_{60}c_{20}) = V.$$

Let the interest of the tenant for life $= V_t$,
" " remainderman $= V_R$,

$$V_t = I(a_{50}t_{40} + b_{60}t_{40} + c_{20}t_{40} - a_{50}b_{60}t_{40} - a_{50}c_{20}t_{40} - b_{60}c_{20}t_{40} + a_{50}b_{60}c_{20}t_{40}) = V_2,$$
$$\text{and } V_R = F - V_t;$$

in which case it is obvious that the values of V_t and V_R depend entirely upon the question whether t_{40} = an annuity upon an average tabular life of that age.

If the fine be calculated arbitrarily,

$$V_t = \frac{V_2 . F}{V},\ V_R = F\left(1 - \frac{V_2}{V}\right)$$

* 4 Beav., 47. † Allan *v.* Backhouse, 2 Ves. & B., 65. ‡ 3 You. & C., 715.

amount which fell to her share, for the purpose of providing at her decease a corresponding portion of the fine charged by mortgage on the estate. The policy was then ordered to be assigned to the mortgagee; and directions were given for paying the premiums upon the policy, and keeping down the interest on the entire mortgage debt, out of the annual rents and profits of the estates.

In reading this case it is impossible to fail to remark, that although the principle is correctly laid down, it is not so correctly applied; for the tenant for life paid, in excess of her share, the interest during her life of the share of the remainderman.

Upon two late occasions, however, the principle of these cases has been disapproved. In Jones *v.* Jones,* there were both leaseholds for lives and years; and Vice Chancellor Wigram considered that there was no distinction between them, and that the proportion and manner in which tenant for life and remainderman were to bear the charge must be the same in both cases. "The rule," he said, "is, that the parties must bear the expense of the renewal in proportion to their respective interests in the estate." This, it is clear, is Lord Eldon's doctrine; but the Vice Chancellor further added this construction:—"The rule," said he, "is, that the parties are to pay in proportion to their enjoyment; by which I understand their actual enjoyment to be meant, and not an extent of enjoyment to be determined by mere speculation, or by a calculation of probabilities. If the tenant for life renews, if he has not the whole enjoyment his estate will have a lien for whatever ought to be paid by the remaindermen;" and when the renewal was by the latter or by a charge upon the estate, he held that the tenant for life should give a security for the sum that he might eventually be liable to pay.

In a still more recent case,† the doctrine in Jones *v.* Jones was commented on with approbation. A policy on the life of the new cestui-que-vie had been approved, as a proper security to be given by the tenant for life; and on the case coming on, upon further directions, the Court observed, "The object in these cases is, that the sum paid out of the capital shall be borne by the parties in proportion to the benefits they derive; and the security, therefore, is for the purpose of bringing back to the capital so much as the tenant for life has had the benefit of, leaving the rest to be borne by the parties who may succeed him; and it is difficult to see how, *when this amount would be payable on the death of the tenant for life,* a policy of insurance on the life of another person

* 5 Hare, 465. † Huddleston *v.* Whelpdale, 9 Hare, 787.

could be a proper security for it. It may indeed be said that, if a fund be provided for the renewal, the remainderman would not suffer; but this is not the principle on which the order of reference to the Master was made, nor, so far as I am aware, a principle on which the Court has ever acted; and it is, in my opinion, at least open to very grave doubt whether it is a principle on which the Court ought to act. What the remainderman ought to bear is so much of the capital paid for the renewal as may not be paid by the tenant for life, in respect of the benefit he has derived; but the principle of this report would throw upon him not merely the interest of the whole capital, but the burden of keeping up a policy for the full amount. It was said, too, that the remainderman would himself be bound to give security, and that he would have the benefit of a policy at a less rate of premium in consequence of the early insurance of the life; but whether this advantage would countervail the additional burden which might fall upon him, would be mere matter of speculation."

It may be doubted whether this reasoning would prove satisfactory to an actuary; and, admitting it to be correct, it must still be asked upon what principle the calculation is to be made. Assuming the additional life to be in existence at the death of the tenant for life, after the expiration of a considerable term, in what manner is the amount to be paid by him to be estimated? If he is to be taken to have been the purchaser of a term absolute, equal to that which he has enjoyed the value of, that term may be more than the fine, leaving nothing for the remainderman to pay for the benefit he actually receives. If the remainderman is to be assumed to be the purchaser of an additional life of the age of the particular cestui-que-vie, when he comes into possession he bears the risk of the deterioration of the life, which, when first named, will of course have been a perfectly sound and insurable life, but may then be in any state of infirmity.*

* For, using the same notation as before, the benefit to the estate at the renewal

$$= I(c_{20} - a_{50}c_{20} - b_{60}c_{20} + a_{50}b_{60}c_{20}) = V_1.$$

Let the tenant for life die at the expiration of 20 years, and suppose the three cestuis-que-vie still surviving, the benefit derived at that time from the addition of the third life

$$= I(c_{40} - a_{70}c_{40} - b_{80}c_{40} + a_{70}b_{80}c_{40}) = V_2.$$

The proportion, then, that the remainderman ought to have paid, supposing it were possible that the fine could have been divided at the time of its payment, $= \frac{F}{(1+x)^n} \cdot \frac{V_2}{V_1}$, and the amount to be paid by him on coming into possession, $= F \cdot \frac{V_2}{V_1}$; but

The Vice Chancellor directed that the policy should be held as a security for what the tenant for life might ultimately be liable to contribute; and, as it was a participating policy, the decree was doubtless correct; for the premium was not in this case the exact measure of the annual contributions, but was in excess, the result of which, namely the bonus, ought always to be divisible in proportion to the actual payments made towards it.

As to the proposition of waiting until the death of the cestui-que-vie to fix the proportions, such an arrangement (which has never, in fact, been suggested in practice) would be liable to this insuperable objection, that it might prevent the complete winding up of the affairs of a deceased tenant for life for a quarter or even more than half a century.

Difficult as the settlement of such cases as that now under consideration proves itself, it will not escape the professional reader that under the new Chancery statutes they are more likely to obtain a correct solution than formerly, since their determination, instead of being referred to the Master and reconsidered in Court under the light of precedent alone, will now be settled by the Judge in Chambers, who will, it may be presumed, avail himself of that competent professional aid suggested by the Masters in Chancery Abolition Act,* and call to his assistance a professional actuary.

Opinions of an American Writer on Modes of Valuation.

THE following remarks, extracted from Mr. Harvey Tuckett's *Monthly Insurance Journal,* published in Philadelphia, are so much to the purpose, that our readers will no doubt readily accede to the insertion of them in this Magazine, particularly as the above named gentleman's publication is at present not accessible to very many persons in this country.

Mr. Tuckett gives a long report of the proceedings at the Meeting of the Institute of Actuaries held on the 31st January last, and in the leading article of his *Journal* comments upon them as follows:—

these amounts, as before, obviously depend upon the value of c_{40}. Should it have greatly deteriorated, it may be only in fact $= c_{70}$, against which risk the tenant for life may put the chance of c's dying in his lifetime = the single premium of a survivorship insurance on the life of c against his own for the amount F; so that the arrangement would be only a balance of injustice.

* 15 & 16 Vict., c. 80, s. 42. See Mildmay *v.* Lord Methuen, 1 Drew, 217.

"We would beg the attention of our readers to the proceedings of the Institute of Actuaries, held at their rooms, St. James' Square, London, on the 31st of January, a report of which is to be found at length on another page, and will well reward a perusal. The question for discussion was the determination and division of surplus in Life Insurance Companies, affording an opportunity to many most eminent actuaries to express their opinions.

"There is no subject of greater importance to the whole body of insurers than a just estimate of the actual dividend-giving power possessed by Life Insurance Companies. If once the public have ascertained and are convinced of the actual limit of this power, all promises of enormous benefits to be bestowed will evaporate before the good sense of the community. Hitherto the plan on which the computations have been made have kept the public in the dark as to the actual state of their affairs; but, by the system which we have always urged, and which we now find meeting the approval of these distinguished actuaries, the public will have the means of judging for themselves.

"We have often explained to our readers the construction of a life insurance premium, as charged to the insurer (see vol. i., p. 29), framed in accordance with a true table (see vol. i., p. 54, 2d col.), as the Carlisle and General Experience are termed. We have shown them that it is formed of two parts, viz.—the net premium, or exact amount which each person would have to contribute, in accordance with the 'tables,' in order to pay the last life the sum contracted for; and, secondly, the 'marginal addition,' or the per centage added to meet the expenses and contingencies of the Company. The first portion, or net premium, is a trust, with which there should be no interference without a close and thorough examination at deferred periods of considerable length; the second, or 'marginal addition,' is the available part after the expenses and contingencies are ascertained, which contains the bonus or dividend-giving power.

"We are sorry, with a learned body like the Institute of Actuaries, that they have not fixed an arbitrary term for this 'marginal addition,' instead of each speaker using in the course of the discussion some different expression to designate this portion of the premium, though the so doing perhaps more clearly shows its importance.

"Mr. Jellicoe calls it the bonus-giving power of a Society—'the provision for the future surplus and expenses.' 'That portion (of premium) required to provide for future contingencies.' 'The

present value of this item appearing on the other side as the guarantee fund.' 'Marginal difference.' 'Marginal excess.'

"Mr. Pinckard calls it 'Profits in anticipation.'

"Mr. Reddish—'The loading intended to provide for expenses and profits.' 'The expense of collecting the premiums.' 'The present value of the loading.'

"Mr. Jenkin Jones—'Additions to the pure premiums.' 'Marginal guarantee.'

"Mr. William Thomas Thomson—'The loading; that is, the difference between the net premium on a true table and the gross premium.' 'Reserve guarantee.' 'Excess of premium'; or 'By whatever name you may call it.'

"In the United States, the Carlisle Table at four per cent. interest has been almost invariably used as that upon which the true or net premium is calculated; therefore, as regards the insurer, all are equal in reference to the basis. In those Companies charging the full premiums, or, 2·36 dollars at 30 years of age, the 'marginal addition' is 33⅓ per cent. added, or 25 per cent. discounted. Now this sum has to provide for all the necessities above described, before the insurer has a right to any dividend for savings, or before any can be granted to him without trenching on the more important deposit—the true premium. If, therefore, the calculations and statements offered to the insurers only give the calculations on the net premium, the account of a low priced Office will show the same results as those of a high premium Office—both being based upon the same original table; but if the present value of the 'marginal additions' appear on both sides of the account, and not on one side only, it is obvious an account so prepared would produce the same result as one formed from the net premium on each side, with the advantage of its being seen what provision the 'marginal additions' made for expenses. This latter method of valuation being adopted, and the insurer aware of the exact value of the 'marginal additions' (never exceeding 25 per cent.), a little good sense would demonstrate to him the real amount of bonus or dividend, after paying expenses, which could be granted, without trenching upon the insurance fund, composed of the net premium and its interest.

"The great error, and one which has given rise to the fallacious dividends granted, has been a concealment from the public generally that the gross premium is composed of two different sums—the one the net premium, calculated at an assumed rate of interest, from a true table, to pay the deaths; the other the 'marginal additions,'

or per centage added to pay all current expenses, correct all errors, form a guarantee fund, and afford a dividend!

"Up to the year 1825, there were only 37 Life Companies in Great Britain; in 1839 these had increased to 67; and in 1851, to 152 Companies. In the earlier stages the science of the actuary was unquestioned, and competition unnecessary; but since 1843, as the latter has become greater the former has become more diffused; and the necessity which has obliged so many Offices to close their business has caused legal inquiries into the principles on which they were based—the dividends how granted—and an improved demand for the services of the actuary in all the necessary valuations. Thence the actuaries have been 'divided into two schools (as Mr. Farren observes), the Old and the New—not to be confounded with the term old and new as applied to Companies, for an old Company may be directed by an actuary of the new school, and the reverse.' The actuary of the old school kept the public in the dark; he of the new school affords the means of judging, as the only safe protection against the errors engendered by too great a competition."

It is scarcely necessary, one would think, to say more than has now been urged upon this subject; but we may take the present opportunity to offer one additional reason why the practice of omitting the "marginal additions" in making valuations must be considered to have a somewhat dangerous tendency.

Let us suppose a Company to be in the receipt of an income from premiums of £100,000 per annum, and that its business was commenced with rates supposed to be equal in every case to the risk, a marginal addition of 25 per cent. being made to them throughout. The portion of income required in such case for the sums assured merely would hence be £80,000, and the remaining £20,000 per annum would be the provision for extra contingencies.

Let us now imagine an investigation to be made as to the real rate of mortality prevailing, and that it be found that, in lieu of the rate originally assumed being borne out, a certain increased one is proved to obtain, the premiums based upon which would make it necessary to devote £90,000 instead of £80,000 per annum to meet the risks; the surplus income being thus reduced to £10,000 per annum only, instead of £20,000. Now, as the change in the rate of premium consequent upon that in the rate of mortality is not immediately apparent, this reduction in the surplus income is not unlikely to escape observation where the net premiums alone are valued, and matters in this way might be allowed to go on as if no such reduction had taken place—a state of things impossible to

be, where the same or nearly the same proportion of the value of the net premiums is always retained. In short, it cannot be too carefully borne in mind that the only means we have in this business of judging as to the future must be derived from a vigilant observation of what has taken place in circumstances as nearly as possible of a similar character, and that thus it behoves us to make from time to time investigations with this object, and to effect such changes in the provision for future liabilities as may thereupon be found necessary, taking care to retain the same or as nearly the same proportionate margin as practicable, to guard against those fluctuations which we know may occur, let the measures based upon our knowledge of the past be as accurate and judicious as they may. We thus virtually exercise a power of raising or depressing the future premiums as the necessities of the case may demand; or, what is the same thing, we increase or diminish the returns of surplus in obedience to the dictates of our experience and in accordance with the law which regulates it, fulfilling in this way, and obviously in the proper manner, the very objects with which the marginal additions were originally made.—Ed. *A. M.*

Assurance Association of Germany.

In the January number of the *Rundschau der Versicherungen* was given an account of a meeting of the representatives of the Fire Assurance Companies of Germany, held at Leipzig, for the purpose of forming an Association. The object of this union will be seen in the following statement, which appeared in the number of the above work for March:—

"Meeting at Leipzig, 13 December, 1852.

"*Present*—

"Herr Hofrath Becker, from Gotha, Manager of the Feuerversicherungs Bank fur Deutschland, in Gotha.

"Herr General Consul Lemonius, from Stettin, Manager of the Preuss. National Versicherungs-Gesellschaft, in Stettin.

"Herr Director Kuntze, of Leipzig, of the Leipziger Feuerversicherungs Anstalt.

"Herr Rent-Amtmann Brunner, of Leipzig.

"Herr Dr. Schultze, of Leipzig, Manager of the Brandversicherungs Bank fur Deutschland, in Leipzig.

"Herr Fried. Knöblauch, from Magdeburg, General Manager of the Magdeburger Feuerversicherungs Gesellschaft; also specially appointed Representative of the Schlesischen Feuerversicherungs Gesellschaft, in Breslau.

"At a Committee for the formation of an Assurance Association of Germany, the Magdeburg Fire Insurance Company was selected

by the representatives of 15 Insurance Companies to conduct the business, and undertook the charge to invite the co-operation of the remaining German Assurance Companies, and to frame an outline of the statutes, which might be laid before the future general meeting to consider and determine upon, in order definitively to constitute the Association.

"In carrying out this commission, the Magdeburg Fire Insurance Company has met with many difficulties, and has therefore been obliged to request the representatives of those Companies of whom the Committee is formed to meet in a conference, and to invite them to the present meeting in Leipzig.

"Besides the above-mentioned Companies, the Vaterlandische Fire Assurance Company in Elberfeld was also invited to this conference, but has, to our great regret, declined. The Schlesische Fire Insurance Company stated that they were prevented sending any one of their managers in particular, and have therefore entrusted Herr Knöblauch specially to be their representative.

"Herr Knöblauch opened the conference with expressing his heartfelt thanks, as well for the trust reposed in making choice of his Company to conduct the preliminary business of the Association, as also for the friendly support which they had given to him personally. He then fully explained the steps already taken towards the establishment of the Association, and of the results which had attended them.

"He then proceeded to explain that amongst the Marine Insurance Companies of Germany there was no disposition to institute a general Assurance Association; and it must be acknowledged that only very small points, of subordinate importance, will be found, in which the Marine have a common interest with the Fire Insurance Companies. They have the less inducement to take part in these measures, inasmuch as the Marine Insurance Companies have already formed an union amongst themselves, by means of which, at their periodical meetings, information may be communicated and regulations framed for the management of the business by general consent. In a similar manner, only a slight degree of interest is taken in the subject by the Companies conducting the business of annuities, and the assurance of capital sums and funds for provision for old age, endowments, and sums payable on death. The most important of these institutions have declined the proposed union with Companies embracing the other branches of assurance. Not much greater interest is felt by the Transport Insurance Companies, by land, sea,

or river, which have also entered into a close union amongst themselves.

"It is true there are several of the Hail and of the few existing Cattle Insurance Companies which have already joined themselves in a friendly manner to the Association; but the members present are unanimously of opinion, after relation of these facts, that in this state of affairs the idea of uniting all the different branches of assurance in a general Association for their common interests, as it is found to be impracticable, must, we regret to say, be given up.

"The present representatives of the different Fire Insurance Companies decide therefore now to use their united efforts in the formation and regulation of an Association of German Fire Insurance Companies, and to renew, in the names of the Companies represented by them, the authority to the Magdeburg Fire Insurance Company to act in the preliminary arrangements.

"This Society is thereby empowered, with the concurrence of all the Companies hitherto invited to the formation of the proposed German Assurance Association, to print this declaration; to make known the change in the plan of the Association, especially to all those Fire Assurance Companies which, though members of the Committee, could not be invited to the present conference by reason of distance; to inform them of the present decision, and to seek their co-operation for the Association as confined to the narrower limits now marked out for it; and earnestly to invite the assistance of all other Fire Assurance Companies, whether they have already signified their concurrence with the German Assurance Association or intimated their intention to do so.

"The next question is, whether it is desirable to restrict the new Association to the fire insurance branch only of the private proprietary and mutual Companies, or whether to solicit the concurrence of the state, town, provincial, and other public institutions of this nature. The members present are unanimously of opinion that the support of these last-mentioned Companies in the Association is much to be desired, so as to extend it as much as possible to the whole assurance interest of Germany; and that the Association will thus have the fairest prospect of complete success. They would therefore not only justify the steps already taken by the Company which has undertaken this business, towards securing the aid of the State authorities, but it would be made a peculiar and pressing duty to continue in the most urgent manner their endeavours in this direction.

"The next question to be considered by the conference is, what should be the principal aim and object of the new Association? It was agreed that it was peculiarly important to gain, by means of the Association, a moral strength, and for this purpose two objects should be kept in view. In the first place, and principally, it should be the task of the Association, from its high position, supported by the practical experience of its members, to obtain from the State authorities of all German States an improvement in the legislation, to correct defects, to work out a removal of oppressive and unjust enactments, and, lastly, to endeavour as far as possible to establish a general system of legislation for assurance in Germany; in the next place, that moral force should be employed to create, both amongst the various private Assurance Companies and those connected with the public institutions, a better understanding than has hitherto prevailed, and co-operation for the common purpose in view; and, above all, that the misunderstandings which have several times recently interrupted the harmony between private Assurance Companies, and which have been a scandal to the public, might in future be altogether banished.

"It must be acknowledged that a unity of action and interests, and, above all, an assimilation of the premiums to be charged, cannot be the duty of the Association; but all who are present will recognize the importance and desirability of the members coming to a general resolution on the ordinary conditions to be inserted in policies, so that thereby a want very much felt by the public might be supplied.

"Lastly, those present decide that, for the maintenance of a good understanding, the members, whether official representatives or agents who have hitherto been actively engaged in forming another Society, should come to a mutual agreement only to proceed therewith, either with the full concurrence of the above Association, or after allowing a space of at least three months to elapse from the time of their leaving the earlier Association.

"We consider the outline of the statutes which the Company by whom the preliminaries of this business have been arranged has laid before us, to be too complicated; and it is besides evident, that by the restriction of the objects of the Association, which has now only to do with the fire insurance branch, a great simplification may and ought to be effected in the statutes.

"The manager of the Gotha Bank, Herr Hofrath Becker, has framed an outline of regulations, which is offered for consideration.

This plan is recommended by its simplicity, and it may be decided not to discuss the different clauses to-day (for we do not consider ourselves called for this purpose); but it may be advisable to print it and send it round with the present declaration, that it may serve as the groundwork of further deliberation in the general meeting to be appointed.

"It will be observed that the sketch of Herr Becker has the advantage of not going into the particulars of the organization which it more properly belongs to the general meeting to agree upon. The question whether the future management of the Association should be confided to the members themselves, with a rotation every year, or whether a permanent Manager should be chosen, with a corresponding income attaching to the appointment, will also be settled by the general meeting.

"No doubt can be entertained that it is most important and desirable that the Association should establish a scientific organ—a periodical in which the members may record the results of their experience, and thereby enable interesting questions, which relate to the assurance business, to be treated of with intelligence for the common good. This periodical should be sent out free, and a price covering the costs should be charged to the members, according to the number of copies which they may require.

"The Manager of the Association (whose duty it should be also to edit the periodical) would have to put himself in friendly communication with other branches of assurance already existing, or with Associations which may hereafter be formed, as well as with similar Associations in other countries—in England (with the Institute of Actuaries) and in France, &c. The information thus acquired by him may be rendered useful to the periodical. The operations of the fire insurance branch should by preference be kept in view; but subjects which are interesting to other branches of assurance may also be treated of, and its pages may be open to the discussion of topics connected with the whole business of assurance.

"Since the management of the Association—in its correspondence with the State authorities, in its efforts to procure a co-operation on the subject of legislation—will demand the performance of important, comprehensive, and laborious duties; and since, further, the editing of this periodical in the manner we have described will require great skill and energy—it seems absolutely necessary that for these objects, for the management of affairs, and direction of

the Association, a qualified person, who might act independently and give his whole attention to the interests of the body, should be engaged. Since such a person will take a very prominent position, requiring confidence in the members, in the public, and in the State authorities, he should receive a corresponding salary.

"The more minute details of the appointment, and the election, must, as has been already explained, necessarily remain to be decided by the general meeting.

"All those Fire Assurance Institutions which may decide to join the new proposed Association shall be invited to a general meeting, to be held at Berlin on Friday, the 6th May next, the locality and time to be named in the invitations. We believe that the meeting must be adjourned to so late a period, not only because the previous negotiations will require a considerable time, but also because the general meetings of most of the Fire Assurance Companies are held in March and April, and it is desirable that these should be first concluded.

"BECKER, Manager of the Feuerversicherungs Bank fur Deutschland, in Gotha.

"LEMONIUS, Manager of the National Versicherungs Gesellschaft, in Stettin.

"W. F. KUNTZE, Manager of the Leipziger Feuerversicherungs Anstalt for the Brandversicherungs Bank fur Deutschland.

"FRANZ. BRUNNER.

"D. SCHULTZE.

"FRIED. KNÖBLAUCH, General Manager of the Magdeburger Feuerversicherungs Gesellschaft, and as Representative for the Schlesischen Feuerversicherungs Gesellschaft."

"Outline of a Plan for the Association of German Assurance Companies, proposed by the Versicherungs Bank fur Deutschland, in Gotha (through their Manager, Herr Hofrath Becker), at the Conference at Leipzig, 13th December, 1852.

"Sect. 1.—For the purpose of common deliberation and mutual co-operation, as well in reference to theory as practice, an Association of German Assurance Companies shall be established.

"Sect. 2.—Every duly authorized Fire Insurance Company having their principal office in Germany may be a member, whether it be purely mutual or purely proprietary, or a mixed Com-

pany, or whether it be a state, provincial, town or commune, or private Company.

"Sect. 3.—Every Company above described shall be at liberty either to join or to leave the Association at any time.

"Sect. 4.—For the purpose of carrying out the objects in Sect. 1, the Association shall hold an annual meeting of its members in a town within the limits of its operations, and, if possible, where a Fire Assurance Company is established. The choice of the locality shall always be made in the previous year, by the decision of the majority of the members present at the general meeting.

"Sect. 5.—Every Fire Assurance Company forming part of the Association shall send to the general meeting a delegate entitled to vote, who may be also accompanied by another delegate.

"Sect. 6.—For the conduct of the transactions and business, every Assembly shall in like manner, a year before, name a committee by a majority of votes, a president, a vice president, and a secretary.

"Sect. 7.—The committee shall send out the invitation to the meeting, provide the the necessary accommodations, and announce, previous to each meeting, the propositions and subjects for consideration which are to be brought before the notice of the members.

"Sect. 8.—Votes on questions under discussion have only for object to settle differences of opinion and to carry out the resolutions which, according to the decision of the majority, concern the common interests of fire insurance business and of the Association. Resolutions which tend to restrict or to affect the principles or management of the business of the different Companies cannot be entertained by the meeting.

"Sect. 9.—The general expenses of every meeting, for the accommodation required, charges for printing, &c., shall be borne by the members in common."

S. B.

Rates of Mortality in the United States and in California.

THE great number of assurances effected by the English Companies on the lives of persons residing in the above-mentioned places renders any information as to the mortality prevailing among them of much importance; and we therefore gladly avail ourselves of an opportunity to lay before our readers the following reports made by Mr. Gill, the able and well known actuary of the Mutual Life Insurance Company of New York. They are addressed to the Board of Trustees of that Company, and are as follows:—

"FIRST REPORT, FEBRUARY 11, 1851.

"In accordance with the instructions of a committee of your body, on my appointment as actuary of the Company, my attention has been chiefly directed during the past year to a rigid examination of the experience of the Company from its commencement to the present time, so far as practicable, and especially with respect to the mortality among its members. I beg leave to lay before you the results of this investigation, with a consideration of some practical consequences which it has suggested.

"It should be premised that I have in all cases taken the assured age as the age of the individual; that is, if a party is assured at the age and rate of 30, I have supposed him to have completed his 30th year on the day of the date of his policy. I am aware that this is contrary to the practice of English actuaries; but it must be remembered that the English Companies assure at 'the age next birthday,' so that if they were to take the assured age as the age of the party, they would make all their members older than they really are. This Company, on the contrary, assure at the age of the nearest birthday; and it is assumed that the errors in deficiency and in excess are equal, and balance each other. At any rate, I have little doubt that, whatever be the amount of error introduced by this supposition, it is less than would probably arise from the additional complexity of calculation required by the attempt to graduate the ages more exactly.

"My attention has been directed, in the first place, to the *annual* experience of the Company, by comparing, for each year, the actual number and amount of claims on the Company, with those that should have occurred according to the table of mortality on which its rates of premium are based. These results necessarily include all classes of assurers in the Company, as well the

Northern as the Southern and Californian risks. The comparison is therefore not strictly just; inasmuch as the mortality among those members to whom we charge an extra premium would be expected to exceed that among the members who pay the tabular premium. As this subject will however be more fully discussed in the sequel, I submit the table without further comment.

"*Annual Experience of the Mutual Life Insurance Company of New York, from* 1*st February,* 1843, *to* 1*st February,* 1851.

Years.	Probable Number of Claims.	Probable Amount of Claims.	Actual Number of Claims.	Actual Amount of Claims.
		Dollars.		Dollars.
Feb. 1, 1843, to Feb. 1, 1844	2·81	10902	0	0
" 1844 " " 1845	7·30	27120	5	18000
" 1845 " " 1846	14·78	51638	7	18100
" 1846 " " 1847	23·56	75858	23	69400
" 1847 " " 1848	31·86	100668	29	71150
" 1848 " " 1849	42·03	132464	27	94200
" 1849 " " 1850	53·75	164481	63	174950
" 1850 " " 1851	63·91	188957	*69	*143640
Total.....	240·00	752088	223	589440

"With a view to form a commencement of the statistical history of the Company, I have tabulated and arranged the experience for the first complete seven years as far as the termination of those annual risks which commenced any time between Feb. 1st, 1849, and Feb. 1st, 1850, and ended at the corresponding date between Feb. 1st, 1850, and Feb. 1st, 1851, in six separate tables, an abstract of which will be found at the end of the Report.

"The first table, marked 'General Experience,' gives the mortality that has occurred among all the assurers and annuitants in the Company, and furnishes a means of comparing the results with the corresponding ones of the Carlisle Table of Mortality; the second, marked 'Class I.,' refers similarly to those members only who reside in the Eastern and Middle States; the third, or 'Class II.,' to the residents of that section of the country west of the Middle States and north of the southern line of Virginia and Kentucky; the fourth, or 'Class III.,' to those residing south of the preceding line and north of the 32nd parallel of latitude; the fifth, or 'Class IV.,' to those residing south of the 32nd parallel of latitude; and the sixth, or 'Class V.,' to those residing in California.

* These numbers may possibly be increased by deaths yet to be heard of, occurring before the 1st of February instant.

"The Company makes no distinction in rates between the Classes I. and II., but it was felt desirable to mark the effect of climate and circumstances in our newly settled Western States; to the assurers of Class III. we charge $\frac{1}{4}$ per cent. extra premium, and to those of Class IV. $\frac{1}{2}$ per cent.

"From the comparatively small amount of data which they afford, the results of these tables can be considered but of little value as an indication of the general statistics of the United States; yet as the first attempt, or rather beginning of attempt, to obtain reliable elements of vital statistics in this country, they are not without interest. But even in their present state they may be relied upon to some extent as a means of comparing the mortality in the different sections of the Union; since, other circumstances being the same, the differences exhibited can only arise from local causes.

"The first thing that strikes us, on a cursory glance at these tables, is the startling mortality among the California (Class V.) risks. It is seen that the claims of this class have been nearly six times as many as they should have been by the table; in fact, the lives assured of this class might, under ordinary circumstances, have been taken at the average age of 28, and at our regular rate of 2·24 per cent., while the claims occurring under these risks were such as, under ordinary circumstances, could only have resulted if their average age had been 70; and therefore their average annual premium should have been 14·93 per cent.—that is, so far as our past experience can be taken as a guide, California risks should have been charged an annual extra premium of 12·69 per cent. in order to place them on an equality with other risks. In strict justice, however, the mortality of the several classes should be compared, not with that of the community at large, as in the Carlisle Table, but with that of each other, or with that of a community *selected* under similar circumstances; which I now proceed to do.

"The aggregate experience of Classes II. and III. is so nearly the same that it would seem necessary to place them on the same footing with respect to premium. There is, however, a great probability that the causes of excessive mortality in Class II. will be ameliorated in a greater degree than in Class III., by causes actively operating in both. On the whole, it would perhaps be unadvisable to increase the rates in Class II.; and it must therefore be the combined experience of Classes I. and II. on which our tabular premiums are paid, with which we must compare that of the other classes.

"The aggregate mortality in Classes I. and II. is ·9481 per cent.; the mortality in Class III. is 27·1 per cent. greater than this; and taking the average age of insuring in the United States at 37, this would lead to the conclusion that the premiums for Class III. should be ·786 per cent. greater than in Classes I. and II.; that is, we ought to charge an extra premium for this class of $\frac{3}{4}$ per cent., instead of $\frac{1}{4}$ as we now do. The mortality in Class IV. is 50·3 per cent. greater than Classes I. and II., and it would thence follow that we should charge an extra premium for this class of nearly $1\frac{1}{2}$ per cent. The mortality in Class V. is 444·3 per cent. greater than that in Classes I. and II., and it follows that the extra annual premium for this class should be 13 per cent.; which amounts to the same as saying that lives in California, in its present state, are not insurable by any cautiously conducted Office, and shows the prudence of the trustees in discontinuing to underwrite these risks almost immediately after commencing.

"It is not pretended that these results are infallible, or even that they are to form a basis on which the Company can at once proceed without hesitation; to render them worthy of such confidence, many more years' experience must be combined with them. But two things may surely be predicated upon them with confidence: 1st, That the urgent solicitations of our agents and members at the South to discontinue the extra premium entirely cannot be complied with without doing great injustice to our Northern members, at least until further experience will justify such a course. 2nd, That no *extra* premiums for climate risks received by the Company can, with any degree of probability, be assumed as having hitherto contributed towards the profits or surplus funds of the Company; and therefore that, in justice to those members who pay the regular table rates, these extra premiums ought not to participate in the profits or surplus. These funds should, in fact, be divided in proportion, not to the actual premium paid, but to the graduated table rates of premium.

"How does the rate of mortality in the Northern United States compare with that in England?

"In order to furnish some slight means of answering this question, so vitally important to the Life Insurance Companies of this country, I have constructed the following table, in which column A is the mortality per cent. in Classes I. and II. of this Company, derived from the preceding data; column B is the mortality per cent., during the *first year* of assurance, among the lives assured

in fifteen English Companies of longest experience; column C is the mortality per cent. among all the lives assured in these Companies, extending through their whole experience to the close of the year 1837.

Age.	A	B	C
25 to 35	·7433	·5884	·7910
35 to 45	·8533	·8872	1·1002
45 to 55	1·2512	1·3181	1·6140
55 to 65	2·8011	2·6755	2·9433
65 to 71	8·9802	3·4060	5·1769

"Still bearing in mind that, from the comparative smallness of the data, the results of column A are not so reliable as those of columns B and C, if the mortality in the Northern United States were nearly equal to that in England, we should expect to find the numbers in column A somewhat greater than those in column B, but materially less than those in column C; and notwithstanding some inequalities, which might have been expected under the circumstances, they in general present such a type. They are not, however, so much smaller than the numbers in column C, as to authorize us to conclude, even if absolute reliance could be placed upon them, that the force of vitality in this portion of the United States is as great as it is in England among the same class. At the same time, the results present, as yet, no reasonable cause of alarm to those Companies whose rates of assurance allow, as the rates of all Companies should do, a sufficiently large margin beyond the rates actually deduced from the English tables of mortality.

"To those Companies, however, which, on the unwarrantable supposition that human life is better on this side of the Atlantic than in Europe, have made their rates equal to and in some cases less than those actually resulting from the tables, not even allowing anything for the expenses of management, these results are a sufficient indication that, unless they change their rates, they must be ultimately unable to fulfil their contracts. One such Company pays its agents 10 per cent. commission on its premiums, and has actually made two annual dividends of 15 per cent. each; while its officers take credit to themselves before the public for the extreme 'caution'! with which they have transacted their business. The rates of another Company are such that they must not only appro-

priate no part of their premiums to the management of their business, but they must invest every cent received for premiums and interest, the moment it is due, at a higher rate of interest than six per cent., in order to have a possibility of paying their policies.

"The same results show also the reckless course of those mutual Life Companies which are making annual dividends of 40 and 50 per cent., or even more. To those Companies which use our rates of premium, and supposing the rate of mortality among assured lives here to ultimately approach that of the Carlisle Table, the net premium which must be used either at present or in future to fulfil their contracts of assurance is 75 per cent. of the premiums they receive; the expenses of management for a series of years cannot safely be estimated at less than 10 per cent. of the premiums; and there remains, then, as a *possible* surplus on which to declare dividends, 15 per cent. In the early years of a Company, the effect of a careful selection of lives may increase this amount, although not to the extent usually imagined, as may be seen by comparing columns B and C of the preceding table; and in after years there is a possible gain from investing at a higher rate of interest than that used in calculating the rates. But it is difficult to conceive a combination of circumstances that would justify a Life Company, charging our rates, in making annual dividends whose present value is more than 30 per cent. of the premiums received.*

"There is one very startling fact exhibited in the preceding table, to which I beg to call the attention of the trustees. It will be seen that, although the aggregate mortality in Classes I. and II. of our Company (column A), between the ages of 35 and 55, is even less than that during the first year of assurance between these ages in the English Companies (column B); yet between 55 and 65 it is nearly equal to that in their extended experience (column C), while above 65 it is nearly twice as great. This circumstance would not be so alarming taken by itself, inasmuch as the number of assurers above the age of 55 is not, in this country, sufficiently large to afford a fair average; but it happens that it is corroborated by the experience of the only other American Life Company whose affairs I have had the opportunity of investigating.

"It is a well known result of all the European contributions to vital statistics, that a marked change, the causes of which are but very imperfectly understood, takes place in the law of mortality

* The present value of the *reversionary* dividend of 52 per cent., made by this Company on the 1st February, 1848, was about 24 per cent.

about the age of 55—so much so, that Mr. Farr, in constructing the 'English Life Table' for the Registrar-General, actually used different mathematical laws for the formation of his table before and after this age; and this period has been called the 'break of life.'

"Can the marked increase of mortality above this age in this Company, partially corroborated as I have stated, arise from the circumstance that this important change in the force of vitality at this period may arise from the same causes, *acting with greater intensity in the Northern United States than in England?* The gravity of this question, and the importance of as speedily as possible getting a correct answer to it, will be clearly seen when it is stated that the price of any life benefit at any age, as 30, depends for its value on the rate of mortality at all the ages *above* that age. Would it not be possible to take the next census of the State of New York in such a way as, at least, to determine this point?

"Apart from this consideration, however, there are others, which need only be glanced at, that render it inexpedient, in my opinion, for any Company in this country to assure lives above the age of 55. Few wish to assure above that age. Of the 9308 policies issued by this Company to Feb. 1st, 1851, but 176 were on lives above the age of 55; while, to make a fair average of the latter class, they should not be much less than one-fourth of the whole. At and above this age the hereditary experience of the party's family becomes an element of much weight as to his future longevity—an element in the consideration of which the applicant has all the advantage of the Company. I have before had occasion to mention that the rates of assurance of this Company, above the age of 55, are too small when compared with the rates below that age; for instance, the rate at 67 is 9·45 per cent., while, calculated on the same principles as the rates for ages below 55, it should be 10·32 per cent.

"These considerations induce me to recommend the trustees to confine their assurance business, so far as the issuing of new policies is concerned, to lives below the age of 56."

Abstract of the Experience of the Mutual Life Insurance Company of New York, from the commencement of the Company, February 1st, 1843, to February 1st, 1851, excluding the unexpired fractions of those Policies whose Annual Risks commenced between February 1st, 1850, and February 1st, 1851.

AGE.	GENERAL EXPERIENCE.					CLASS I.					CLASS II.				
	Number of Lives which commenced any year of age between the ages opposite.	Number who died before completing that age.	Number of probable Deaths by the Carlisle Tables.	Actual Mortality per cent.	Probable Mortality per cent. by Carlisle Tables.	Number of Lives which commenced any year of age between the opposite ages.	Number who died before completing that age.	Number of probable Deaths by the Carlisle Tables.	Actual Mortality per cent.	Probable Mortality per cent.	Number of Lives commencing any year of age between the opposite ages.	Number who died before completing that age.	Number of probable Deaths by the Carlisle Tables.	Actual Mortality per cent.	Probable Mortality per cent.
Under 15	13·	0	·070	0·	0·5385	13·	..	·070	0·	0·5385					
15 to 25	3222·9	13	5·774	1·5676	0·7017	605·6	4	4·247	0·6605	0·7011	43·6	..	·307	0·	0·7040
25 to 35	6510·	64	61·433	0·9831	0·9437	4597·4	34	43·346	0·7395	0·9428	918·4	7	8·784	0·7622	0·9564
35 to 45	6888·3	61	84·215	0·8855	1·2226	4754·1	37	58·157	0·7783	1·2233	1105·8	13	13·516	1·1756	1·2223
45 to 55	2682·	38	39·152	1·4168	1·4598	1932·2	23	28·232	1·1904	1·4611	385·6	6	5·599	1·5560	1·4520
55 to 65	545·8	18	13·645	2·2979	2·5000	403·1	10	10·063	2·4808	2·4964	61·	3	1·598	4·9180	2·6197
65 to 75	50·4	4	2·378	7·9365	4·7182	41·4	3	1·991	7·2464	4·8092	7·	1	·299	14·2857	4·2714
Above 75	4·	0	·630	0·	15·7500	4·	..	·631	0·	15·7500					
Total..	17516·4	198	207·297	1·1304	1·1834	12350·8	111	146·737	0·8987	1·1852	2521·4	30	30·103	1·1898	1·1939

	CLASS III.					CLASS IV.					CLASS V.				
15 to 25	16·	1	·113	6·25	0·7050	9·	..	·063	0·	0·7	141·6	7	1·002	4·9435	0·7076
25 to 35	356·7	3	3·378	0·8410	0·9470	331·4	8	3·161	2·4140	0·9538	223·4	11	2·026	4·9239	0·9070
35 to 45	404·3	2	4·953	0·4947	1·2251	404·4	5	4·974	1·2364	1·2299	111·2	4	1·308	3·5971	1·1763
45 to 55	179·8	2	2·632	1·1123	1·4638	135·5	..	1·976	0·	1·4584	25·6	4	·371	15·6250	1·4492
55 to 65	38·8	4	·939	10·3092	2·4201	31·9	..	·762	0·	2·3887	2·	..	·037	0·	1·8500
Total..	995·6	12	12·015	1·2053	1·2068	912·2	13	10·936	1·4251	1·1988	5·038	26	4·744	5·1608	0·9416

"SECOND REPORT, MAY 9, 1853.

"I beg leave to present to you the results of my investigation of the extended experience of the Company, comprising two years more than that contained in my former Report of February 11th, 1851.

"*Annual Experience of the Mutual Life Insurance Company of New York, from* 1*st February*, 1844, *to* 1*st February*, 1853.

Years, terminating Feb. 1st.	Actual.		Probable, by the Carlisle Life Table.		Probable, by the Company's Life Table.	
	No. of Claims.	Amount of Claims.	Number of Claims.	Amount of Claims.	Number of Claims.	Amount of Claims.
1844	0	0	2·81	10902	2·96	11461
1845	5	18000	7·30	27120	7·72	29703
1846	7	18100	14·78	51638	15·55	54530
1847	23	69400	23·56	75858	24·96	80485
1848	29	71150	31·86	100668	33·67	107017
1849	27	94200	42·03	132464	44·37	140495
1850	63	174950	53·75	164481	56·81	174608
1851	71	154640	63·91	188957	67·61	200827
1852	50	166600	68·27	200856	72·48	214350
1853	68	206100	71·95	214479	76·56	229729
Total ..	343	973140	380·22	1167423	402·69	1243205

"It is seen that, although the actual number of deaths, when compared with the probable, is somewhat less during the two last years than in the eight preceding (as indeed might be expected, since the latter included the cholera year of 1849 and the extraordinary mortality in California), yet the actual amount of claims, when compared with the probable, is somewhat greater.

"I have farther carried out and tabulated (see Abstract II.) the mortuary history of the Company, in the five different sections of country over which nearly all its risks are scattered, for the nine complete years of its existence, as far as the termination of those annual risks which commenced any time between the first February, 1851, and 1st February, 1852, and terminated at the corresponding dates between February 1st, 1852, and February 1st, 1853, as explained in my previous Report.

"Perhaps it will facilitate the comparison of the recent mortality in the different sections with that exhibited in the previous Report, if the total mortality per cent. in each section during these two periods is shown thus:—

	Before 1851.	Since 1851.	Whole time.
In the whole Company	1·1304	1·0309	1·0917
„ Class I.	0·8987	0·8831	0·8928
„ Class II.	1·1898	0·9193	1·0716
„ Class III.	1·2053	1·3940	1·2743
„ Class IV.	1·4251	1·8907	1·5960
„ Class V.	5·1608	3·0783	4·2968

"Class I. includes those members residing in the Eastern and Middle States, as also the States of Maryland and Virginia.

"Class II., those residing west of the former, and bounded south by the southern line of Kentucky and Missouri.

"Class III., those residing south of the former line, and north of the 32nd parallel of latitude.

"Class IV., those residing south of the 32nd parallel of latitude.

"Class V., those residing in California.

"It will thus be seen that, although the mortality in Classes I., II., and V., as well as in the whole Company, has been less since 1851 than before that period, yet in Classes III. and IV. it has been greater, and to an extent somewhat alarming.

"Without repeating a course of reasoning similar to that in the preceding Report, it is sufficiently obvious that the trustees are more than justified in having, at the late distribution, excluded the small extra premiums received from members of these classes from all participation in the surplus funds. Indeed, it becomes a grave question whether the Company can, in justice to their other members, underwrite future risks in those sections of country at the rates heretofore charged.

"The most gratifying feature in these results is that exhibited in Class II.; the approximation of the mortality in that section to that in Class I. strengthens the probability I ventured to predict in my first Report, that the trustees will be justified in continuing the benefits of their institution to those great and growing States on the same terms as to their other Northern members."

Abstract (II.) of the Experience of the Mutual Life Insurance Company of New York, from the commencement of the Company, February 1st, 1843, to February 1st, 1853; excluding the fractions of Policies whose Annual Risk commenced between February 1st, 1852, and February 1st, 1853.

AGE.	GENERAL EXPERIENCE.					CLASS I.					CLASS II.				
	Number of Lives which commenced any year of age between the ages opposite.	Number who died before completing that age.	Actual Mortality per cent.	Probable Mortality per cent. by the Carlisle Table.	Probable Mortality per cent. by the Comp'y's Life Table.	Number of Lives which commenced any year of age between the ages opposite.	Number who died before completing that age.	Actual Mortality per cent.	Probable Mortality per cent. by the Carlisle Table.	Probable Mortality per cent. by the Comp'y's Life Table.	Number of Lives which commenced any year of age between the ages opposite.	Number who died before completing that age.	Actual Mortality per cent.	Probable Mortality per cent. by the Carlisle Table.	Probable Mortality per cent. by the Comp'y's Life Table.
Under 15	15·	0	0·	0·5333	0·6333	15·	0	0·	0·5333	0·6333					
15 to 25	1264·4	16	1·2654	0·7017	0·7556	930·4	6	0·6449	0·7019	0·7599	99·8	0	0·	0·7034	0·7705
25 to 35	10190·4	94	0·9224	0·9461	0·9520	7109·6	49	0·6892	0·9439	0·9503	1543·5	13	0·8422	0·9544	0·9590
35 to 45	11442·8	106	0·9263	1·2275	1·2377	7745·1	59	0·7618	1·2274	1·2361	1994·5	20	1·0027	1·2252	1·2321
45 to 55	4676·1	63	1·3472	1·4598	1·7496	3330·1	41	1·2312	1·4601	1·7446	712·8	9	1·2626	1·4554	1·7523
55 to 65	986·9	27	2·7358	2·5261	2·8737	726·9	18	2·4763	2·5380	2·8706	116·8	4	3·4246	2·5478	2·9074
65 to 75	86·1	6	6·9686	4·7863	5·5877	70·1	4	5·7061	4·8716	5·6876	12·	2	16·6667	4·3667	5·5000
Over 74	10·	1	10·	14·8200	16·5600	10·	1	10·	14·8200	16·5600					
Total ..	28671·7	313	1·0917	1·2019	1·2720	19937·2	178	0·8928	1·2074	1·2794	4479·4	48	1·0716	1·1998	1·2645

	CLASS III.					CLASS IV.					CLASS V.				
15 to 25	23·4	2	8·5470	0·7051	0·7478	12·3	0	0·	0·7073	0·7805	187·8	7	3·7274	0·7039	0·7577
25 to 35	543·9	3	·5516	0·9570	0·9441	477·8	10	2·0929	0·9628	0·9709	401·2	17	4·2373	0·9093	0·9294
35 to 45	649·9	8	1·2309	1·2318	1·2386	664·1	11	1·7078	1·2781	1·2789	210·2	8	3·8059	1·1874	1·2093
45 to 55	291·	3	1·0309	1·4660	1·7660	232·	2	0·8621	1·4689	1·7383	55·9	5	8·9445	1·4454	1·7710
55 to 65	61·3	4	6·5253	2·3017	2·7732	54·9	0	0·	2·5427	2·8706	6·	0	0·	1·9734	2·5500
Total ..	1569·5	20	1·2743	1·2139	1·2874	1441·1	23	1·5960	1·2356	1·2888	861·1	37	4·2968	0·9745	1·0262

London Fires in 1852.*

"The statistics of London fires are by no means devoid of interest, and the time may come when they will form an index to the social advancement of the people; for in proportion as houses are built more and more fireproof, and habits of carefulness become more and more diffused, the number of destructive fires will assuredly lessen."—*Knight's London.*

THE total number of fires reported is 923, being 5 less than in the preceding year. Of these fires, 250 were extinguished by the inmates, without external aid; 377 were extinguished by the inmates, with casual assistance; while the extinction of 296 devolved upon the firemen. Parish engineers either wholly extinguished or materially assisted in the extinguishing of 59 fires. The total number of calls given at the fire-engine stations was 1,105—a decrease of 54 upon last year's number. In 25 instances the premises were totally destroyed; in 238, considerably damaged; while in 660 cases the damage was very trifling.

The following table shows the monthly distribution, which in 1852 was unusually irregular:—

Months.	Number of Fires.	Fatal Fires.	Number of lives lost.	Chimneys on fire.	False Alarms.
January	89	4	4	14	9
February	82	0	0	11	14
March	100	2	2	11	7
April	79	1	1	12	12
May	93	1	1	6	3
June	58	2	2	8	7
July	93	5	6	7	10
August	72	3	3	3	4
September	65	3	5	2	7
October	57	2	3	3	7
November	69	1	1	5	5
December	66	3	3	7	8
TOTAL	923	27	31	89	93

Instances in which insurances were known to have been effected upon the building and contents	442
Upon the building only	124
Upon the contents only	74
No insurance	283
	923
Alarms from chimneys on fire	89
False alarms	93
Making the total number of calls	1,105

* From the Report in the *Mechanics' Magazine*, March 5th, 12th, and 19th, 1853, by Mr. William Baddeley, C.E., Inventor of the Portable Canvas Cisterns, Improved Jet-spreaders, Farmer's Fire-engine, Every Man his own Fireman, &c. &c.

The number of fatal fires again exhibits an increase on those of the previous year, as does also the number of lives lost. The fatal fires may be classed as follows:—

	Fires.		Lives lost.
Personal accidents from the ignition of wearing apparel	14	—	14
" " intoxication	4	—	4
" " explosion of fireworks	1	—	2
" " " steam-boiler	1	—	1
" " " fire-annihilator composition ..	1	—	1
Firemen killed by falling walls	1	—	2
*Inability to escape from burning building, or killed in attempting to do so	5	—	7
	27		31

Of the personal accidents, some were of a peculiar character. The first of this description happened on the 16th January, in Wardour Street, when a Mr. Calder met his death from the ignition of naphtha spirit, with which one of Holliday's lamps was being replenished. When the lamp was three parts filled, the spirit suddenly took fire, and, igniting Mr. Calder's clothes, burned him so severely that he expired, five days afterwards, in the Middlesex Hospital. At the very time this catastrophe occurred, an inquiry was pending before Mr. Wakley, the coroner, upon a young man who had been killed at Highgate by the explosion of another of Holliday's lamps, while in the act of being refilled. At this inquest Mr. Holliday contended that neither the spirit nor its vapour possessed any explosive property; but that question being referred to Dr. Scoffern on behalf of the friends of the deceased, and to Professor Miller on behalf of Mr. Holliday, those gentlemen found by experiment that the vapour was not of itself explosive, but that, when mixed with atmospheric air in certain proportions, it became highly explosive and dangerous.

Another unfortunate and fatal accident occurred on the 29th July, at Wapping Wall, where a female was burnt to death while preparing an embrocation containing, among other ingredients, spirits of turpentine, which boiled over, and, filling the apartment with flame, caused the death of the manipulator. Melting beeswax cost another female her life.

The manufacture of fireworks has this year, as in the preceding, caused the death of two of the parties so engaged. This catastrophe took place on Sunday, October 3rd, in Rose and Crown Court, Moorfields, upon the premises of Mr. Holyhead. A terrific explosion took place in the evening, and two boys were so dreadfully burned that they died in the hospital on the following day.

* Four of these cases were not within the limits of the Fire-escape Society.

At the coroner's inquest a verdict of manslaughter against Mr. Holyhead was returned, and he was tried thereon at the Old Bailey sessions. His counsel contended that there was no evidence to show that the prisoner had been guilty of wilful neglect, and the jury returned a verdict of not guilty.

The deaths from inability to escape from burning buildings present many of the usual, and some of them unusually, distressing characteristics. The first of these took place on Thursday, January 29, in Welbeck Street, Cavendish Square, when a sheriffs' officer named Webster, who had been put in possession of the premises on the previous evening, lost his life. The inmates of the house effected their escape through a trap-door in the roof; but the deceased, being unacquainted with the premises, or being overpowered by the smoke, did not follow them as they expected, and his lifeless body was found in his bed-room, after the extinction of the fire. The origin of the fire was most suspicious; Mr. Werndly, the occupier of the premises, having effected a large insurance upon his furniture, of which he had employed an appraiser to take an inventory only three days before the fire. At the inquest upon the unfortunate deceased, twelve out of thirteen jurymen were unanimously of opinion "That the deceased was burnt to death, but how the fire occurred there was not sufficient evidence to enable them to decide."

The next fatal fire of this class broke out at half-past three o'clock on the morning of Friday, April 2nd, in Moor Street, Soho, on the premises of Mr. Oakey. Before discovered, the fire had made such extensive progress as to cut off all possibility of escape by the staircase, and a neighbour, perceiving the danger of the inmates, ran to Golden Square for the fire-escape of St. James's parish; his application was, however, met by a positive refusal, the conductor coolly telling the applicant (Mr. Day) that, Moor Street being out of his district, he could not possibly render any assistance. A similar application from a policeman met with a like refusal! The consequence was, that seven persons, including two young children, were precipitated into the street, three of them from a third-floor window, all of whom were more or less hurt—one of them, a foreigner, so seriously, that he died of the injuries received.

On Sunday, September 12, a lamentable fire occurred in Middlesex Street, Somers Town, at the house of Mr. White, linen-draper. Shortly before two o'clock in the afternoon the servant girl went into the shop with a lighted candle, when a large body of gas took fire, and instantly filled the shop with flames, which

rapidly ignited its highly combustible contents. A person named Balham, with his wife and four children, who lodged on the second-floor, were unable to descend the staircase; these parties, with the exception of one boy, 3½ years old, effected their escape with great difficulty from the windows. This poor little fellow was overlooked in the confusion, and after the extinction of the fire was found dreadfully burnt in the ruins.

Sunday, September 19th, Rotherhithe was the scene of a sad calamity. Shortly before one o'clock, a.m., the firemen on board of the floating engine heard cries of "fire" and "save us," and instantly raised an alarm. A police constable arrived soon after, and found the premises of Mr. Hogg, ironmonger and ship-chandler, on fire, and heard some women screaming most piteously, apparently in the shop; thinking to rescue them, he broke open the door. While this was going on, a niece of Mr. Hogg leaped from the first-floor window, with her face and hands much burnt. Mr. Hogg next precipitated himself from the second-floor window into a counterpane held for his reception; but his weight split it in two and he fell heavily on the stones, receiving such severe injuries that he afterwards expired in Guy's Hospital. The only other inmates, a female relative and the servant girl, were never seen until their disfigured remains were dug out of the ruins after the fire was extinguished.

From this painful subject, however, turn we to one of a more gratifying description. The year just ended has to the *Royal Society for the Protection of Life from Fire* been one of great and important usefulness; during that period the fire-escape conductors have been in attendance at 254 fires, and have accomplished the rescue of 50 lives, viz.:—

		Lives saved.
March 9,	No. 40, Goswell Street	9
April 11,	„ 120, Whitecross Street	2
„ 13,	„ 15, Nassau Street, Middlesex Hospital	5
May 9,	„ 2, Hoxton Square	3
„ 14,	„ 34, Featherstone Street	5
June 15,	„ 21, Nassau Street	4
„ 25,	„ 152, Upper Whitecross Street	3
Aug. 27,	„ 33, Whitechapel Road	3
Sept. 16,	„ 16, Oxford Street	2
„ 20,	„ 57, Backchurch Lane, Whitechapel	4
Oct. 18,	„ 4, Sherborne Lane, Lombard Street	5
„ 29,	„ 29, Webber Street, Blackfriars Road	2
Nov. 11,	„ 5, Lant Street, Borough	3
		50

At almost all these fires, the very prompt attendance of the fire-escape, and the skilful and efficient exertions of its conductors, were

the theme of universal approbation. In addition to the 50 human lives thus providentially saved, much valuable assistance has upon many occasions been rendered by the escape-men. Thus, for instance, at the serious conflagration which destroyed the extensive premises, stock, and plant of Mr. Grimsdell, builder, in Bell Lane, Spitalfields, on the evening of Sunday, October 3. In a very short time after the alarm of fire was given, two of the Royal Society's fire-escapes were in attendance. At that time the fire was raging in a large pile of timber in close contiguity to the stable, the door of which was on fire, and within were eleven fine horses. Conductor Wood (Whitechapel station) perceiving the imminent peril of these animals, immediately went round to the back of the premises, and, forcing out a window with his crowbar, set to work most vigorously to make an opening sufficiently large for the horses to come out of. With the assistance of Sergeant Price, of the metropolitan police, he succeeded in making an opening, through which all the horses and harness were rescued amid the cheers of the bystanders. The only matter of regret is, that neither the humanity thus displayed, the extraordinary exertions made, nor the value of the property saved from destruction, ever obtained from Mr. Grimsdell or the insurers (the Lancashire Fire Office) the smallest mark of gratitude for the services rendered upon this occasion by the fire-escape conductor and the police constable.

During the past year six new stations have been provided with fire-escapes, viz.:—The New Road, corner of Albany Street; Camden Town, in front of the Southampton Arms; Oxford Street, corner of Dean Street (this station was enabled, soon after the fatal fire in Wood Street, to provide for the safety of the inhabitants of that neighbourhood); Oxford Street, corner of Connaught Place; Westminster, Broad Sanctuary; ditto, Horseferry Road: making the present number of stations 38.

Other stations have been decided upon, and only wait the completion of local arrangements for their adequate support.[a] As the want of such aids becomes felt in various districts, and the inhabitants are willing to provide sufficient funds, the Royal Society are prepared to go on extending the sphere of their usefulness until the whole of this vast metropolis is protected by a continuous chain of fire-escapes, at intervals of half a mile, each attended nightly by a properly appointed conductor, skilled in the use of his machine, and prepared to render all needful assistance in case of fire.

The following is an analysis, in a tabular form, of the fires which occurred in London last year, exhibiting in each instance the occupancy of the part of the premises in which the fire originated, and the comparative liability to accident by fire of various trades, manufactories, and private dwellings:—

Occupation.	Totally Destroyed.	Seriously Damaged.	Slightly Damaged.	Total.
Apothecaries, and dealers in drugs (no laboratories)	1	..	5	6
Bakers	1	5	7	13
———, biscuit	..	..	1	1
———, muffin	..	..	1	1
———, pie	..	1	2	3
Barge and boat builders	..	..	1	1
Basket-makers	..	1	..	1
Beer-shops	..	1	4	5
Blacking-makers	..	..	1	1
Bleachers	..	1	..	1
Booksellers, bookbinders, and stationers	2	8	8	18
Bottle-merchants	..	..	1	1
Brewers	..	1	..	1
Brokers and dealers in old clothes	..	1	8	9
Builders	1	5	3	9
Cabinet-makers	1	7	7	15
Cane-dyers	..	1	..	1
Carpenters and workers in wood (not cabinet-makers)	1	22	33	56
Caoutchouc-manufacturer	..	..	1	1
Cement-works	..	1	..	1
Chandlers	..	7	8	15
Charcoal and coke, dealers in	..	1	1	2
Cheesemongers	..	4	3	7
Chemists (including laboratories)	..	..	2	2
Churches	..	..	2	2
Chicory and coffee roasters	..	..	2	2
Coach-makers	..	..	1	1
Coffee-shops and chop-houses	1	5	12	18
Colour-makers	..	1	..	1
Confectioners and pastrycooks	..	2	1	3
Coopers	1	..	1	2
Corkcutters	..	..	1	1
Corn-chandlers	..	2	..	2
Cotton wool (dealers in)	..	1	..	1
Curriers and leather-dressers	..	1	1	2
Distillers, illicit	..	..	1	1
———, tar	1	1	..	2
———, turpentine	..	1	..	1
Drapers, woollen, linen, and mercers	..	15	23	38
Druggists, wholesale	..	1	4	5
Drysalters	..	1	..	1
Eating-houses	..	3	11	14
Engineers, mechanical	1	1	1	3
Farming stock	1	5	2	8
Fire-annihilator maker	1	..	..	1
Firework-makers	..	2	..	2

Occupation.	Totally Destroyed.	Seriously Damaged.	Slightly Damaged.	Total.
Founders	..	..	4	4
Furriers and skin-dyers	..	..	1	1
Gas-works	..	2	2	4
Glue-makers	..	1	..	1
Grocers	..	2	5	7
Hat-makers	..	1	..	1
Hemp-dressers	..	1	3	4
Horsehair-merchants	..	..	2	2
Hotels and club-houses	..	..	2	2
Japanners	..	2	1	3
Lampblack-makers	..	1	1	2
Laundresses	..	..	3	3
Lucifer-match makers	..	2	3	5
Manchester warehouses	..	3	3	6
Marine stores, dealers in	..	2	5	7
Mats, dealers in	..	..	1	1
Milliners and dressmakers	..	2	7	9
Musical instrument makers	..	..	2	2
Oil-mills	1	..	..	1
Oil and colourmen (not makers)	..	4	9	13
Painted baize makers	..	2	..	2
Painters, plumbers, and glaziers	..	2	1	3
Paper-makers	1	1	..	2
——— stainers	1	1	1	3
Pasteboard-makers	..	1	..	1
Pawnbrokers	..	..	1	1
Pipe-makers	..	..	1	1
Printers, letter-press	..	3	2	5
———, copper-plate	..	1	..	1
Private dwellings	1	33	303	337
Public buildings	..	..	1	1
Rag-merchants	..	..	4	4
Railways	..	..	3	3
Rope-makers	1	2	..	3
Sale shops and offices	1	11	25	37
Saw-mills, steam	1	3	3	7
School of industry	..	..	1	1
Scum-boilers	..	..	1	1
Ships	..	..	5	5
——, steam	..	1	..	1
Ship-builders	..	2	..	2
—— chandlers	1	..	..	1
Silk-dresser	..	..	1	1
Soot-merchant	..	..	1	1
Stables	..	3	13	16
Straw-bonnet makers	..	2	..	2
Sugar-refiners	..	1	1	2
Tailors'	..	5	9	14
Tallow-chandlers, melters, wax-chandlers, and soap-boilers	..	1	3	4
Tanners	..	..	1	1
Tarpaulin-makers	..	1	1	2
Tinmen, braziers, and smiths	..	3	4	7
Tobacconists	..	2	5	7
Toy-warehouses	..	..	3	3
Under repair and building	2	4	7	13
Unoccupied	..	1	5	6
Upholsterers	..	1	..	1

Occupation.	Totally Destroyed.	Seriously Damaged.	Slightly Damaged.	Total.
Varnish-makers	..	1	2	3
Victuallers	2	13	25	40
Warehouses	..	3	3	6
Weavers	..	1	1	2
———, mat	..	..	3	3
Wharfingers	..	..	1	1
Wine and spirit merchants	..	..	4	4
Wood-merchants	..	1	1	2
Total	25	238	660	923

The daily distribution of last year's fires was as follows:—

Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	Sunday.
144	137	133	127	129	117	136

Their distribution through the hours of day and night has been in the following proportion:

	First hour.	Second Hour.	Third hour.	Fourth hour.	Fifth hour.	Sixth hour.	Seventh hour.	Eighth hour.	Ninth hour.	Tenth hour.	Eleventh hour.	Twelfth hour.
A.M.	61	59	40	33	19	20	17	14	23	25	20	26
P.M.	32	18	28	27	25	50	51	57	80	82	67	49

The causes of fire, so far as could be satisfactorily ascertained, may be stated as follows:—

Accidents, unforeseen, and for the most part unavoidable	15
Apparel, ignited on the person	9
Bleaching hops	1
——— nuts	1
Candles, various accidents with	131
——— ignited bed-curtains	73
——— ——— window-curtains	49
Carelessness, palpable instances of	17
Charcoal fires	1
Chicory-roasting	1
Children playing with candles	1
——— fire	6
Children playing with gunpowder	1
——— lucifers	4
Cinders put away unextinguished	19
Coppers overheated	2
Fire sparks	69
——— kindled on hearths and other improper places	7
Fire-arms, discharging	2
Fireworks, making	4
———, letting off	6
Friction	1
Flues, foul and ignited	34
———, defective or overheated	37

Flues, blocked up	10
——— of hot plate	3
Fumigation, incautious	2
Furnaces	16
Gas, escape of, from defective fittings	55
——————— street mains	2
——, lighting of	6
—— burning too high	9
——, explosion at works	2
Hearths, defective	2
Intoxication	9
Lamps, oil	2
———, naphtha	3
Lime, slaking of	7
Linen, drying or airing before fire	39
Lucifer-matches, making	3
——————— accidentally ignited	8
——————— accidentally ignited by a cat	1
——————— accidentally ignited by sun's heat	2
———————, using	13
Naphtha, explosion of	1
———, bottle of, broken	1
Ovens, defective and overheated	7
Pitch and tar, boiling of	4
Shavings, loose, ignited	49
Spontaneous ignition of dung	1
Spontaneous ignition of lampblack	3
——————— phosphorus	2
——————— rags, wet	4
———————, greasy	1
——————— tan	1
Smoking in bed	1
Stills, illicit	1
Spirits, drawing off	1
Steam-boilers, heat from	3
———————, explosion of	1
Stoves, improperly set, defective, and overheated	17
——, drying	10
——, ironing	2
——, muffin	1
——, pipe	9
——, portable	2
——, gas	2
Suspicious	9
Tobacco unextinguished	25
Varnish and oils, &c., boiling of	7
Wilful	15
	865
Unknown	58
Total	923

The causes of fire during the past year, it will be seen, do not present any remarkable feature of novelty. The discharge of fire-arms has caused two fires, but neither of them were very serious in their consequences. One of these accidents happened in Highbury Grove, Islington, shortly before eleven o'clock in the evening of 5th July. About an hour previous, one of the inhabitants, thinking an attempt was being made to enter his premises for the purpose of robbery, discharged a gun, as a caution to the intruders. The wadding, falling among a quantity of shavings in an unfinished building, set fire thereto, and threatened to destroy it; by the prompt and active exertions of the police and neighbours, however, the fire was soon extinguished.

Soon after two o'clock in the morning of January 26, a fire occasioned by a cat did considerable damage to the premises of Mr. Bryan, grocer, &c., in Queen's Place, Holloway. It appeared that pussy, in her nightly perambulations, came upon the stock of lucifer-matches, which by her awkward mode of handling she contrived to ignite; the inflammable contents of the shop were soon in a blaze, and the premises seemed doomed to destruction. The prompt arrival and judicious application of the Holloway fire-engine, however, confined the damage to the shop and parlour—in the latter of which was found the dead body of the feline incendiary, pussy having died of suffocation.

A fire caused by *rain* is about the last thing that would be supposed capable of producing such a calamity; several of last year's fires were, however, so occasioned. The rain, slaking of lime, produced so much heat as to ignite combustible matters in contact therewith.

A singular fire broke out in Lincoln's Inn Fields on Wednesday evening, August 4. A large waggon belonging to Messrs. Younghusband and Co., railway-carriers, laden with hemp, was being driven through the square, when all at once a body of flame burst forth from the hemp; the horses being detached, the waggon was upset and the burning mass thrown into the road. The brigade-engine from Holborn, with a body of firemen, had to be called in to extinguish the fire, the origin of which could not be very well accounted for. Spontaneous combustion or unextinguished tobacco is supposed to have been the cause.

The necessity of more attention being given to the regular cleaning of chimneys is shown by the fact, that in no less than 34 instances chimneys on fire proved serious matters. "Oh, it's only a chimney on fire—there's no danger," is an every-day remark. On the 20th of April last, the firemen were called to a fire at No. 10, Dorset Street, Marylebone. The inmates observed "there's no danger," and refused admittance to the firemen. In one hour after the mistake was made manifest, and the firemen's aid earnestly solicited. The fire had communicated to the joists and rafters, several of which were burned, the ceilings in back and front rooms pulled down, and the contents much injured.

Total Losses.—Upon 25 occasions the premises in which the fire originated were totally destroyed, the number of buildings destroyed being 31. This result is attributable in 19 cases to the fire having obtained a great head before it was discovered. In 9 cases the fires were so far distant from the nearest engine-station as to preclude the possibility of timely aid. The total destruction of Mr. Hogg's premises (September 19) was occasioned by breaking open the street-door to try to save the inmates. Four total losses were owing to late and scanty supplies of water.

An important trial, as regards Water Companies, took place recently at Bristol. The premises of a cabinet-maker named Laverton, carrying on an extensive business in Redcross Street, were discovered to be on fire at two o'clock in the morning of September 2nd. The firemen promptly attended with their engines, but no water could be obtained from the mains for upwards of

two hours, and the sufferer brought an action against the British Waterworks Company for the amount of his loss. Mr. Baron Platt observed, that "there was a stipulation in the Act of Parliament that the Company should give protection to the public, and, in case of fire, water was to be ready to extinguish it. It was part of their bargain that they should afford that benefit to the public, as part of the service for which they were paid and the monopoly given them. It was the duty of the Company to keep their mains full, and it was a serious dereliction of their duty to have neglected it." The jury returned a verdict for the plaintiff for the amount of his loss, £531. 18*s.* 7*d.*!

The remaining total loss was the destruction of the manufactory and stores of Phillips's Patent Fire-Annihilator Company, in Battersea Fields, on Sunday, October 31st, which was attended with loss of life. About eleven o'clock in the forenoon, a large quantity of composition, which was drying in the oven or drying-stove, ignited with a loud explosion, and immediately fired the premises. The wife of the watchman, the only person at that time on the premises, appears to have been either killed by the explosion, or suffocated by the noisome vapour with which the place was instantly filled. After the fire had been extinguished, the poor woman was dug out of the ruins, sadly mutilated.

Considerably damaged.—At no less than 208 fires considerable damage was sustained, and in this class are to be found some of the heaviest fires of the year: in 19 instances the premises were "all but destroyed."

Death of Two Firemen.—Shortly before seven o'clock in the evening of Thursday, July 15th, a most disastrous conflagration broke out in the premises of Messrs. Conbro and Potter, ship-chandlers, No. 2, Haydon Square, Minories. Fire-engines from the various stations rapidly arrived, and were placed in the most commanding positions; that from the Whitecross Street station was taken into Swan Street, in the rear of the burning premises, to protect the houses on that side. John Crampton, senior fireman, was holding the branch pipe, and Alfred Wilson, engineer, was standing by his side giving directions, when one of the lofty walls suddenly fell outwards, burying both the unfortunate men in a mass of bricks, &c. The greatest exertions were immediately made to extricate the sufferers. Crampton was first got out, dreadfully crushed and quite dead. Soon after the bleeding body of Wilson was dug out; and, life not being extinct, he was taken

to the London Hospital, where he almost immediately expired. At an inquest held upon the following day, the jury returned a verdict "that the two deceased lost their lives, casually and by misfortune, through assisting in extinguishing a fire in Haydon Square, but how the said fire occurred there is no evidence to prove." On the following Monday, the remains of Crampton and Wilson were buried at St. Luke's, with all the tokens of respect which a sense of their worth, and regret for their untimely and melancholy death, could suggest. In addition to a numerous attendance of mourning relatives, the followers included Mr. Braidwood, the superintendent; Messrs. Fogo, Colf, Staples, and Henderson, the district foreman, and as many of the firemen as could be safely withdrawn from other duties; a body of fire-escape conductors, and a large number of the City and Metropolitan Police from the G and H divisions: the attendance of the greater portion of those parties being for the most part voluntary. In his Official Report to the Committee of the London Fire-Engine Establishment, Mr. Braidwood says: "Wilson and Crampton were two of the best firemen of their standing in their establishment." They each left a widow and four children. The committee have kindly allowed Mrs. Wilson 16*s.* and Mrs. Crampton 13*s.* per week.

The Floating Fire-Engine, as intimated in my last, has been fitted with steam power for working the pump, so that no future inconvenience will arise from a deficiency of manual labour. Propulsion by the jet has been attempted, without any better success than I predicted; and in consequence of its increased draught of water, much difficulty will always be experienced in conveying this powerful agent to distant fires. Mr. Braidwood reports that this engine is now double the power it formerly was. The arrangement of the steam-engines and mode of working the pumps is exceedingly good, and is capable of discharging an immense quantity of water; but from malformation of the water-passages, and from other causes, the character of the jets is sadly defective, and the height at which they are delivered by no means equal to what might be expected from the power employed.

NOTES AND QUERIES.

ON THE FORM OF THE NUMBER WHOSE LOGARITHM IS EQUAL TO ITSELF.

THE logarithm of any number is commonly to be characterized as being less than that number, for in all systems zero is the logarithm of unity. When, however, it is asked what is the logarithm of an infinite number, the reply may also be, an infinite number, and thereby the number and logarithm may be considered as virtually resolving into each other. The question of *form*, however, still remains. In illustration of this, the equation $y=\varepsilon^y$ may be taken, thence to find the series at once representative of y in its double character of number and logarithm to itself. To obtain the aid of Lagrange's theorem put $y=a+x\phi y$, and thereupon y becomes equal to

$$a+x\phi a+\frac{x^2}{1.2}(\phi a)^2\frac{d}{da}+\frac{x^3}{1.2.3}(\phi a)^3\frac{d^2}{da^2}+\text{\&c.}$$

Reapplying this to the first equation, a becomes o, $x=1$, and $\phi y=\varepsilon^y$, so that $\phi a=1$, and the different orders of the differential coefficients become 2, 3^2, 4^3; hence

$$y=1+\frac{2}{2}+\frac{3.3}{2.3}+\frac{4.4.4}{2.3.4}+\frac{5.5.5\,5}{2.3.4\,5},\ \text{\&c.},$$

the form sought. The hint of the preceding simple resolution has been taken from some papers by that eminent mathematician, the late Rev. Robert Murphy, Esq., M.A., author of *The Theory of Equations, &c.*, among some scraps preserved by a pupil of his (Robert Tucker, Esq.), and kindly sent to the present writer for examination. Among the same scraps there is a simple shaping out of the process to be followed in arriving at Mr. Murphy's own well known theorem, fairly characterized by Professor De Morgan as "one of the most general and interesting contributions which analysis has received for many years." (*Diff. Cal.*, p. 328.)

If α be a root of the equation $\phi x=o$, then $-\alpha$ is the coefficient of $\frac{1}{x}$ in the expansion of log. $\frac{\phi x}{x}$.

For let β, γ, &c., be the other roots, then $\phi x=C\times(x-\alpha)(x-\beta)(x-\gamma)$, &c., and

$$\frac{\phi x}{x}=C^1\times\left(1-\frac{\alpha}{x}\right).\left(1-\frac{x}{\beta}\right).\left(1-\frac{x}{\gamma}\right)\text{\&c.};$$

therefore

$$\log.\frac{\phi x}{x}=\log.C^1+\log.\left(1-\frac{\alpha}{x}\right)+\log.\left(1-\frac{x}{\beta}\right)+\text{\&c.},$$

of which the only part which contains negative powers of x is

$$\log.\left(1-\frac{\alpha}{x}\right),\text{ or }-\alpha\frac{1}{x}+\left(\frac{\alpha^2}{2}.\frac{1}{x^2}\right)-\left(\frac{\alpha^3}{3}.\frac{1}{x^3}\right)+\text{\&c.};$$

therefore coefficient of $\frac{1}{x}=-\alpha$.

Although to the general reader the preceding illustrations may appear simply mathematical, yet the student of life assurance and probability will readily detect their application, if he happen to remember, as it has been shown elsewhere, that the Napierian logarithm is representative of what the writer has been tempted to call integral as contrasted with differential mortality.

EDWIN J. FARREN.

We have been favoured by Mr. C. W. Merrifield, of the Privy Council Office, with the following method of obtaining an expression for the rate of interest in immediate annuities:—

Let q be the present value of an annuity, divided by the amount, r the rate of interest, and $n(=m-1)$ the term of years—the annuity being *in possession*, not *deferred*.

By the common formula, $q=\dfrac{(1+r)^{n-1}}{r(1+r)^n}$; and

$$\therefore\ \frac{1}{1+r}=\frac{1}{q+1}\left\{q+\left(\frac{1}{1+r}\right)^{n+1}\right\}=\frac{1}{q+1}\left\{q+\left(\frac{1}{1+r}\right)^{m}\right\}.$$

By Laplace's theorem, we know that, if $u=\mathrm{F}(z+y\phi u)$, F, ϕ, and ψ being any functions whatever,

$$\psi u=\psi\mathrm{F}z+\phi\mathrm{F}z\frac{d\psi\mathrm{F}z}{dz}y+\frac{d}{dz}\left\{(\phi\mathrm{F}z)^2\frac{d\psi\mathrm{F}z}{dz}\right\}\frac{y^2}{1.2}+\frac{d^2}{dz^2}\left\{(\phi\mathrm{F}z)\ \frac{d\psi\mathrm{F}z}{dz}\right\}\frac{y}{1.2.3}+\ldots\ldots^*$$

making $z=q$, $y=1$, $u=\dfrac{1}{r+1}$, $\mathrm{F}u=\dfrac{u}{q+1}$, $\phi u=u^m$, $\psi u=\dfrac{1}{u}=r+1$;

and therefore

$$\phi\mathrm{F}z=\left(\frac{q}{q+1}\right)^m,\ \psi\mathrm{F}z=\frac{q+1}{q}=1+\frac{1}{q},\ \frac{d\psi\mathrm{F}z}{dz}=-\frac{1}{q^2},$$

we have

$$r+1=\frac{q+1}{q}-\frac{q^{m-2}}{(q+1)^m}-\frac{1}{1.2}\frac{d}{dq}\frac{q^{2m-2}}{(q+1)^{2m}}-\frac{1}{1.2.3}\frac{d^2}{dq^2}\frac{q^{3m-2}}{(q+1)^{3m}}-\ldots\ldots$$

the $(x+1)^m$ term being $-\dfrac{1}{1.2.3\ldots\ldots x}\dfrac{d^{x-1}}{dq^{x-1}}\dfrac{q^{xm-2}}{(q+1)^{xm}}$;

or, performing the differentiations,

$$r=\frac{1}{q}-\frac{q^{m-2}}{(q+1)^m}-\frac{(2m-2)(2m-3)}{1.2}\frac{q^{2m-2}}{(q+1)^{2m}}\left(1-\frac{m}{m-1}\frac{q}{q+1}\right)$$
$$-\frac{(3m-2)\,(3m-3)\,(3m-4)}{1.2.3}\frac{q^{3m-3}}{(q+1)^{3m}}\times$$
$$\left\{1-\frac{2m}{m-1}\frac{q}{q+1}+\frac{3m}{m-1}\frac{3m+1}{3m-2}\frac{q^2}{(q+1)^2}\right\}-\ldots\ldots\ldots\ldots$$

* See De Morgan's *Differential and Integral Calculus*, pp. 168-170.

Mr. Merrifield proceeds to show that the convergency of this series depends upon a limit, lying between

$$\left(\frac{nq+q}{nq+n}\right)^{n+}\frac{(n-q)}{q(q+1)} \text{ and } \left(\frac{nq+q}{nq+n}\right)^{n}\frac{n-q+1}{(q+1)^2},$$

being less than unity, which must always be the case, provided n exceed q, and both n and q exceed unity; whence the series is convergent for every case that can arise in practice. He adds, it is hardly perhaps necessary to remark that, in interpreting these (and other general formulæ for annuities at compound interest) for periods involving a fractional portion of a year, such as $\left(n+\frac{1}{x}\right)$ years, it must be assumed that a payment $= \frac{\text{annuity}}{x}$ is made at the end of the $(n+1)$th year; or, if the fractional payment is made at any other period, it must be (not equal, but) commercially equivalent to $\frac{\text{annuity}}{x}$.

Mr. James Meikle, an abstract of whose paper appears at the commencement of this Number, communicates the following method, which we have slightly abridged, of obtaining the value of a life annuity at one rate of interest from the value at another given rate.

Let A = the given value.

A′ = a value required at a lower rate; then

$$A = {}_1av^1 + {}_2av^2 + {}_3av^3 + \ldots\ldots\ldots\ldots\ldots\ldots + {}_nav^n$$

$$\begin{aligned} A' &= {}_1a(v+\Delta v)^1 + {}_2a(v+\Delta v)^2 + {}_3a(v+\Delta v)^3 + \ldots\ldots + {}_na(v+\Delta v)^n \\ &= {}_1av^1 + {}_1a(\Delta v)^1 + {}_2av^2 + {}_2a2v\Delta v + {}_2a(\Delta v)^2 \\ &\qquad + {}_3av^3 + {}_3a3v^2\Delta v + {}_3a3v(\Delta v)^2 + {}_3a(\Delta v)^3 + \&c. \\ &= {}_1av^1 + {}_2av^2 + {}_3av^3 + \ldots\ldots\ldots\ldots\ldots\ldots + {}_nav^n \\ &+ \frac{\Delta v}{v}\left\{{}_1av^1 + 2_2av^2 + 3_3av^3 + 4_4av^4 + 5_5av^5 + \ldots\ldots + n_nav^n\right\} \\ &+ \frac{(\Delta v)^2}{v^2}\left\{{}_2av + 3_3av^3 + 6_4av^4 10_5av^5 + \ldots\ldots\ldots\ldots + \frac{n.n-1}{1.2}\,{}_nav^n\right\} \\ &+ \&c. \end{aligned}$$

But ${}_1av^1 + {}_2av^2 + {}_3av^3 + \ldots\ldots + {}_nav^n = A$;

and ${}_1av^1 + 2_2av^2 + 3_3av^3 + \ldots\ldots + n_nav^n$ is the expression for the value of an increasing annuity $= \frac{S_x}{D_x}$.

Also

$$\begin{aligned} &{}_2av^2 + 3_3av^3 + 6_nav^n + \ldots\ldots\ldots \frac{n.n-1}{1.2}\,{}_nav^n \\ &= \frac{S_{x+1} + S_{x+2} + S_{x+3} + \ldots\ldots\ldots S_{x+n}}{D_x} \\ &= \frac{\Sigma S_{x+1}}{D_x}. \end{aligned}$$

In like manner

$$
\begin{aligned}
&{}_3av^3+4_4av^4+10_5av^5+20_6av^6+\ldots\ldots+\frac{n.n-1.n-2}{1.2.3}\,{}_nav^n \\
&=\frac{S_{x+2}+2S_{x+3}+3S_{x+4}+\ldots\ldots}{D_x} \\
&=\frac{\Sigma S_{x+2}+\Sigma S_{x+3}+\Sigma S_{x+4}+\ldots\ldots}{D_x} \\
&=\frac{\Sigma^2 S_{x+2}}{D_x}\text{: and so on.}
\end{aligned}
$$

Hence

$$A'=A+\frac{\Delta v}{v}\frac{S_x}{D_x}+\frac{(\Delta v)^2}{v^2}\frac{\Sigma S_{x+1}}{D_x}+\frac{(\Delta v)^3}{v^3}\frac{\Sigma^2 S_{x+2}}{D_x}+\&c.$$

Example.—Let the annuity at age 89, Carlisle 4 per cent., be given. Find the annuity at 89, Carlisle 3 per cent.

$$
\begin{aligned}
A &= 2{\cdot}577040 \\
\frac{\Delta v}{v}\frac{S_x}{D_x} &= {\cdot}085865 \\
\frac{(\Delta v)^2}{v^2}\frac{\Sigma S_{x+1}}{D_x} &= {\cdot}001949 \\
\frac{(\Delta v)^3}{v^3}\frac{\Sigma^2 S_{x+2}}{D_x} &= \underline{{\cdot}000038} \\
&\ 2{\cdot}664892 \\
A' &= 2{\cdot}664895
\end{aligned}
$$

In the same manner it may be shown that the value of a life annuity at a higher rate of interest may be expressed in terms of the value at a lower rate.

$$A'=A-\frac{\Delta v}{v}\frac{S_x}{D_x}+\frac{(\Delta v)^2}{v^2}\frac{\Sigma S_{x+1}}{D_x}-\frac{(\Delta v)^3}{v^3}\frac{\Sigma^2 S_{x+2}}{D_x}+\&c.$$

It has been contended, in some recent discussions on questions of probability, that if a coin, admitted to be "dynamically true," be tossed up a hundred times, and turn up head a hundred times successively, the probability at the next throw is in favour of tail; for, argue the supporters of this view, in any given number of trials with such a coin, it is probable that the number of heads turned up will be equal to the number of tails; and as such average must be maintained, the more frequently the one event has occurred the less likely it is to recur thereafter. The fallacy of this argument appears to us to lie in the assumption of an hypothesis, the terms of which are inconsistent. If a coin were "dynamically true," it never would, on being tossed many times in succession, afford the same result. If it did, we should be justified in assuming that it was not of that character, and that some cause was at work which rendered the one event always more probable than the other. Being true, one result might be looked for at any time just as much as the other; and experiment, when of sufficient duration, would no doubt afford evidence that such expectation was well founded.—Ed. *A. M.*

FOREIGN INTELLIGENCE.

GERMANY.—*Aix-la-Chapelle and Munich Fire Insurance Company* (*Aachener und Munchener Feuerversicherungs Gesellschaft*).—Abstract of the Report and Accounts for the year 1852, presented at the 29th General Meeting, held 21st March, 1853.

1. *Summary of the Assurances.*

On 31st December, 1852, sums remaining assured, £78,263,033.
Assurances in force during the year, £83,763,203.

2. *Profit and Loss Account.*

Dr.		£	*Cr.*		£
Losses paid, costs of management, and reassurances		105,884	Brought from 1851		213,573
Interest paid		3,429	Excess of reserve for unsettled losses of 1851		7,143
Profit on interest	£14,239		Premiums and policy charges for 1852, after deducting return for policies cancelled £149,257		
„ premiums	30,333		Interest received	17,667	
	£44,572				166,924
Whereof—			Claims realized by reassurances		428
Dividends at £7·43 per share		22,286			
For general purposes		22,286			
Reserve for unsettled losses		6,857			
Reserve for risks in force for 1853, and for extra risks		227,326			
		£388,068			£388,068

3. *Share Account.*

The share capital consists of 3,000 shares, total £428,571.
The number of losses by fire amounted to 1,208.

In the address to the members, it is stated that in the course of the year 1852 £8,570,000 more assurances had been in force than in 1851. The receipts of premium had been increased by £14,571, the total reserve by £18,143, and the profits from interest by £1,303.

In the course of the year which has commenced, the business has also made a considerable progress, since in every one of the past months a larger amount of premiums has been received than in the corresponding month of last year.

Equally gratifying results have attended the investment of capital. If it were desirable to realize at this time, a profit could be obtained of not less than £20,961, whereby the members may rest satisfied that the actual value of the capital might be secured even in unfavourable periods.

RUSSIA.—*Russian Company for Fire Insurance, established* 1827. *Capital* (4,000,000 *silver rubles**) £600,000, *independent of the reserve fund in the Imperial Bank of Commerce.—Extract from the Statutes.*

§ 12. Some of the directors must attend at the office of the Company one day in the week, to afford any information required. (The directors meet on Wednesday, from 11 to 2 o'clock.)

§ 61. Every party assuring for 5 years shall pay only the premium and crown duty for 4 years; and for assurances constantly renewed a still further reduction of premium will be made.

* Silver ruble = 3*s.*, nearly.

§ 84. The Company agrees, from the day of payment of the premium, to the full extent of its capital, to reinstate every loss arising from fires occasioned by accident. At the general meeting held 15th February, 1853, one of the directors (Aide-du-camp General Count Orloff) addressed the shareholders, and stated that, with regard to the operations of the Company in 1852, the number of assurances as compared with the preceding year had increased, the receipts of premiums had been greater, and the losses less. The extension of the Company's business in various parts of the empire had necessarily caused also an increase in the expenses.

General Statement.

		£
Premiums on assurances		135,286
Interest on capital		31,014
		166,300
Deduct—	£	
Expenses of management	20,517	
Losses	50,890	
		71,407
Profits of the year		£94,893

This sum shows a highly profitable result for the year; and the dividend might be increased, but it is to be borne in mind that in 1851 the dividend was rather higher in proportion to the profits, and that the amount added to the reserve fund was much less than in preceding years. The directors have therefore decided to distribute in dividends for 1852 the sum of £67,500, being £6. 15*s.* per share, and about 6*s.* more than has been given in any year since the establishment of the Company, and to add the difference (£27,393) to the reserve fund, which now amounts to £141,636.

Cash Account for the year 1852.

Receipts.		£
Assurance premiums		135,286
Interest on the capital, £798,523, in the Bank of Commerce	£ 30,187	
Interest on the notes of the Bank	407	
	30,594	
Interest on the sum paid for the purchase of the Society's house	420	
		31,014
		166,399
Payments.	£	
Expenses of management and agencies	12,784	
Remuneration to agents and directors	7,733	
	20,517	
Payment of losses	50,890	
		71,407
Net profit for the year 1852		£94,893
Of this sum—	£	
Dividends to the shareholders	67,500	
Added to reserve fund	27,393	
	£94,893	

Balance-sheet.

Dr.	£	£	*Cr.*	£	£
Cash in hand		3,974	Share capital		600,000
Capital in the Bank of Commerce	798,523		Reserve capital previous to 1852	114,197	
Interest accrued	30,186		Profits now added	27,393	
		828,709	Proportion of dividends do.	46	
Purchase of the Company's house, and costs of purchase		10,948			141,636
Value of furniture		525	Dividends due, but unpaid		1,595
Assurance premiums and crown duties receivable		6,912	Do. from profits of 1852		67,500
			Crown duties payable		7,216
			Due to the Minister of the Interior, for the police		21,648
			Unsettled claims, valued at		11,473
		£851,068			£851,068

St. Petersburg.—Report laid before the Annual General Meeting of the Shareholders of the Nadejda St. Petersburg Commercial Company for Marine, River, and Land Insurance, from January 1, 1852, *to December* 31, 1852.

	£	£
Received in 1851	8,500	
Amount of premiums received after deduction of agents' commission, discount, and reinsurances	61,019	
Interest to December 31, 1852, on capital deposited in the Imperial Banks	6,435	
Total receipts		75,954
Deduct—		
Indemnities to assured, paid to December 31, 1852	42,851	
Guild dues, salaries, rent and office expenses, stationery, furniture, &c. &c.	2,830	
		45,681
Remainder		30,273
Which it is proposed to allot as follows:—		
Dividend, on the 10,000 shares of the Company, of £1. 1*s.* per share	10,500	
To the six directors, pursuant to § 11 of the Company's statutes, 1 per cent. to each on the amount of dividend paid out	630	
		11,130
Balance reserved and carried forward to 1853		19,143
		£30,273

Balance-sheet, December 31, 1852.

Dr.	£	£
Imperial Commercial Transfer Bank—		
15,330 Imperial Treasury Bonds	114,975	
Interest due thereon, to December 31, 1852	1,817	
		116,792
Imperial Commercial Bank—		
Invested in 29 tickets of said Bank	41,220	
Interest due thereon to December 31, 1852	819	
		42,039
Cash, in notes and coin		738
Sundry debtors—Premiums outstanding with agents and bankers		26,581
Guild dues, paid in advance for the ensuing year 1853		154
Furniture, stationery, and stamps—value in hand		724
		187,028
Cr.		£.
Fundamental capital—Paid up for 10,000 shares of £15 per share		150,000
Reserve capital—Balance carried forward to 1853		19,143
Dividends—		
Unclaimed	£166	
Appointed for 1852 on 10,000 shares, at £1. 1*s.* per share	10,500	
		10,666
Sundry creditors—Sums to be paid on outstanding accounts		7,219
		£187,028

CORRESPONDENCE.

APPROXIMATE VALUES OF ANNUITIES ON THREE JOINT LIVES.

To the Editor of the Assurance Magazine.

SIR,—A question has presented itself to my mind, which appears to be of considerable interest, viz., whether the approximate value of an annuity on *three* joint lives would be more accurate, if it were obtained by means of the *curtate expectation* of the *two* joint lives, instead of being determined, as at present, by means of the *value of an annuity* on the same joint lives, at the particular rate of interest involved in the calculation.

Considering this to be an important question, I have troubled you with the following very brief investigation of it.

Mr. Milne has taken considerable pains—in note xiii. to art. 529, p. 720, vol. ii., of his valuable work—to investigate one portion of this particular class of approximations, viz., whether it be expedient to combine the age of the younger or of the elder life with the new age resulting from the previous combination of the two other lives; but I am not aware that the subject which I propose to discuss in the present letter has been brought under consideration by any of the various mathematicians who have written on the doctrine of life contingencies.

Simpson's rule, as given by Morgan, for approximating to the value of an annuity on the joint continuance of three lives, A, B, and C, is as follows:—

"Let A be the youngest, and C the oldest, of the three lives; take the value of the joint lives B and C, and find the age of a single life, D, of the same value nearly; then find the value of the joint lives A and D, which will be the answer."

This rule, in my notation, would be expressed thus:—Find in the tables of the values of annuities $\mathrm{I}_{\mathrm{D}}=\mathrm{I}_{\overline{\mathrm{BC}}}^{1}$; then find the value of $\mathrm{I}_{\overline{\mathrm{AD}}}^{1}=\mathrm{I}_{\overline{\mathrm{ABC}}}^{1}$ for the answer.

Now the question I would propose is this—Whether the new age, D, resulting as above and as above ascertained, is probably more or less accurate than if the age were found from the tables of the curtate expectations of *two* joint lives (*see* the Carlisle Table, Jones, tab. xl.); as thus:—

$\mathrm{E}_{\mathrm{D}'}=\mathrm{E}_{\overline{\mathrm{BC}}}^{1}$; and from thence, $\mathrm{I}_{\overline{\mathrm{AD}'}}^{1}=\mathrm{I}_{\overline{\mathrm{ABC}}}^{1}$ for the answer.

The assumption on which these approximations are founded is, that

$$\frac{b_1c_1}{bcr}+\frac{b_2c_2}{bcr^2}+\frac{b_3c_3}{bcr^3}+\frac{b_4c_4}{bcr^4}+\&c.=\mathrm{I}_{\overline{\mathrm{BC}}}^{1}$$

$$=\frac{d_1}{dr}+\frac{d_2}{dr^2}+\frac{d_3}{dr^3}+\frac{d_4}{dr^4}+\&c.=\mathrm{I}_{\mathrm{D}};$$

which will necessarily give

$$\frac{a_1d_1}{adr}+\frac{a_2d_2}{adr^2}+\frac{a_3d_3}{adr^3}+\frac{a_4d_4}{adr^4}+\&c.=\mathrm{I}_{\overline{\mathrm{AD}}}^{1}$$

$$= \frac{a_1b_1c_1}{abcr} + \frac{a_2b_2c_2}{abcr^2} + \frac{a_3b_3c_3}{abcr^3} + \frac{a_4b_4c_4}{abcr^4} + \&c. = \mathrm{I}_{\overline{\mathrm{ABC}}}^{\,1};$$

but

$$\frac{b_1c_1}{bc} + \frac{b_2c_2}{bc} + \frac{b_3c_3}{bc} + \frac{b_4c_4}{bc} + \&c. = \mathrm{E}_{\overline{\mathrm{BC}}}^{\,1}$$

may be equal to

$$\frac{d'_1}{d'} + \frac{d'_2}{d'} + \frac{d'_3}{d'} + \frac{d'_4}{d'} + \&c. = \mathrm{E}_{\mathrm{D}'},$$

without, however, D′ being equal to D; and our business is to determine which is probably the true age, D′ or D. Now it is quite manifest that D′ and D must be both older than either B or C; and the two series of which $\mathrm{E}_{\mathrm{D}'}$ and I_{D} are respectively the sums, must each consist of fewer terms than either of the two corresponding series, of which $\mathrm{E}_{\overline{\mathrm{BC}}}^{\,1}$ and $\mathrm{I}_{\overline{\mathrm{BC}}}^{\,1}$ are respectively the sums. The series

$$\frac{d'_1}{d'} + \frac{d'_2}{d'} + \frac{d'_3}{d'} + \frac{d'_4}{d'} + \&c.,$$

therefore converges with greater swiftness than the series

$$\frac{b_1c_1}{bc} + \frac{b_2c_2}{bc} + \frac{b_3c_3}{bc} + \frac{b_4c_4}{bc} + \&c.;$$

and the series

$$\frac{d_1}{dr} + \frac{d_2}{dr^2} + \frac{d_3}{dr^3} + \frac{d_4}{dr^4} + \&c.,$$

converges with greater swiftness than the corresponding series

$$\frac{b_1c_1}{bcr} + \frac{b_2c_2}{bcr^2} + \frac{b_3c_3}{bcr^3} + \frac{b_4c_4}{bcr^4} + \&c.$$

It is therefore manifest that the sum of the first n terms of

$$\frac{d'_1}{d'} + \frac{d'_2}{d'} + \frac{d'_3}{d'} + \frac{d'_4}{d'} + \&c.,$$

will bear a greater proportion to the full value $\mathrm{E}_{\mathrm{D}'}$, or, in other words, more nearly represent the sum of the entire series, than the sum of the first n terms of the series

$$\frac{b_1c_1}{bc} + \frac{b_2c_2}{bc} + \frac{b_3c_3}{bc} + \frac{b_4c_4}{bc} + \&c.,$$

although the sums of the two series complete may be in fact identical. Hence we deduce that the swifter the convergency of the series, the fewer will be the terms of significant value. Hence, also, any operation which tends to increase the convergency of the series, tends also to diminish the number of terms of significant value, and to throw the weight of the value of the total series into the earlier terms. Therefore the introduction of the element interest, by increasing the denominator of every fraction in the series by $\frac{1}{r}$ and its powers, renders it more rapidly convergent, and tends to throw a still greater proportion of the total value into the early terms of

the series. Hence it would seem that the age D is more likely to be the true age than the age D′; and, further, the higher the rate of interest, the more likely is the approximation to be correct. And thus the answer to the question proposed, is, that the present mode of approximation by means of *the values of annuities* is preferable to that by the *curtate expectation* of the lives.

I am, Sir, your obedient servant,

PETER HARDY.

London Assurance, April 11, 1853.

QUALIFICATION AND ENROLMENT OF ACTUARIES.

To the Editor of the Assurance Magazine.

SIR,—With reference to the "Sketch of a Plan for the Establishment of a Professorship in connection with the Institute," that appeared in the last number of this *Magazine*, and particularly with reference to the remarks made by Mr. E. J. Farren at the special meeting held on the 19th April last, on the subject of one of the resolutions, moved by that gentleman, to the effect that "no legislation on Life Assurance Associations can be permanently effective that does not exact tests as to the respectability and acquirements of persons allowed to practise as actuaries," I beg to offer a few remarks.

Mr. Farren has suggested that there should be a register of persons who desire to practise as actuaries; and he proposes that, as a test of general attainments, the candidates for enrolment shonld be required to have passed the Matriculation Examination of the University of London.

Full particulars of the regulations of that body will be found in the *University Calendar* for the current year. I enclose, however, for your own information, a schedule of the subjects of that examination, as well as of those for the Degree Examination, and an extract from the prospectus of one of the affiliated Colleges of the University; from which you will see that the opportunity of attending the courses required by the University for a degree is, by a recent alteration in the regulations, now afforded to those whose daily engagements might, under the former *régime*, have prevented them from availing themselves of the advantages offered.

Mr. Farren's scheme stops short, I regret to say, at the Matriculation Examination; after passing which, the candidate becomes only an undergraduate of the University, and is still supposed to be *in statu pupillari*. This examination may be passed by a youth of sixteen. Now I feel sure that upon reflection Mr. Farren will see that this examination is not sufficient, and that he will probably agree with me that the degree of B.A., at least, should be one of the qualifications for registration as an actuary.

Mr. Farren would also require the production of certificates of attendance at the lectures at some recognised Institution.

It is well known that the mere attendance at lectures is no test whatever of the attainments of the student (unaccompanied, I mean, by examination in the subjects of the lectures). Now if the candidate for registration is to be required to produce certificates of attendance at lectures, he may as well at once be required to attend such particular courses as will entitle him to be examined for the degree of B.A.

I think the possession of this degree, in addition to the diploma of the

Institute, together with a certificate of having been actually engaged in a Life Assurance Office of a certain standing for at least five years, and that he is practically acquainted with the business of life assurance in all its details, should fairly entitle the candidate to enrolment as an actuary. This certificate should be given by the actuary of the Company, *being himself a qualified actuary.*

The examination in bookkeeping I have not lost sight of; but Mr. Farren forgets that this subject forms part of the regular Institute examination.

Of course, a graduate of Oxford, Cambridge, Dublin, and Durham, and probably of some of the Scotch Universities, should be exempt from the Degree Examination by the University of London, but not from the examination required by the Institute of Actuaries; nor, of course, from the production of the certificate of practical knowledge of the business of life assurance.

I may here remark, that the University of London was incorporated by royal charter in the year 1837, and that it receives annually a grant from the Crown.

The London University is now upon an equal footing with Oxford and Cambridge as regards the regulations respecting attorneys and solicitors, and (with the exception, I believe, of Lincoln's Inn) all the Inns of Court now treat graduates of these Universities alike; and it is considered beyond doubt that before long the London graduates will be constituted a parliamentary constituency.

The unwarranted assumption of the title of actuary by persons totally incompetent to perform the functions that properly appertain to what I should be disposed to call the *profession* of an actuary, needs some immediate check; and this, it appears to me, is the time to press the question, now that a Parliamentary Committee is investigating the state of life assurance generally.

The examinations of the Institute may tend in some degree towards the desired end; but of course, in proportion to the incompetence of an individual, will he be likely to stand aloof from any voluntary examination: and the more ignorant the man, the less he is aware of the responsibilities he incurs, and shows how true it is that

> "Fools rush in where angels fear to tread."

The Institute certificate, however, is not enough by itself; the mere acquaintance with mathematical formulæ is not sufficient test, *per se*, of the qualifications of an actuary. A considerable amount of general knowledge is necessary, as well as an acquaintance with monetary and financial questions. *Experience*, too, is a most essential element in the materials of an actuary. Now I fear many of the so called actuaries, whose names we see blazoned forth in the public papers, are wanting in this essential element at least.

I am forcibly reminded of the following lines of Horace, when speaking of the way in which men arrogate to themselves the name of poets. He says,

> "Ludere qui nescit campestribus abstinet armis,
> Indoctusque pilæ, discive, trochive, quiescit;
> Ne spissæ risum tollant impunè coronæ.
> Qui nescit versus, tamen audet fingere."

We never hear of a man totally ignorant of the law daring to assume the functions of a legal adviser, nor of an unqualified quack being appointed as physician to a public hospital; and yet we hear of people calling them-

selves actuaries, assuming a title the very meaning of which they do not perhaps know, and presuming to advise public companies on questions involving points of mathematical theory, monetary questions, and business experience, and actually assuming the duties of managers of institutions in which hundreds of thousands of pounds may be at stake, and to which the social interests of thousands are confided. Truly these gentlemen are not so nice as the "*indocti pilæ*" of old; they do not seem to mind a laugh at their expense; and, reckless of the consequences of their rashness, are content to say (again to quote the satirist),

> "Occupet extremum scabies, mihi turpe relinqui est,
> Et quod non didici, sanè nescire fateri."

With reference to the question of the establishment of a Professorship in connection with the Institute, I will add a few words.

It will readily be admitted, should the Degree Examination be insisted on (which of course would necessitate the Matriculation Examination, as proposed by Mr. Farren), that the present plan of the Institute examination may be in some degree modified, so as to dispense—say, with the arithmetical part of the examination, the more easy algebraical portion, and the geometrical altogether, by making a greater point of those portions of mathematics on which the theory of annuities and assurances depend; and by extending the practical questions, and introducing not only such questions as occur in the business of life assurance, but those of a higher class, such as come before the actuary in his private practice, and before the actuaries of Reversionary Companies; and, above all, by introducing the study of subjects, the necessity of which to the well informed actuary Mr. Jellicoe has, I believe, on more than one occasion pointed out, and among which I may mention political economy.

Now with the view to satisfactory preparation for such an examination as this, it would of course be highly desirable that a well qualified Professor should be appointed, attendance at whose lectures for a certain term I would make compulsory on the Associates; and, farther, after due notice if any Associate should not within a reasonable time pass the necessary examinations, or at least offer himself for examination, and enable the examiners to report that he had attained a certain *minimum* of knowledge, such Associate should cease to be a member of the Institute.

One of the principal objects of the Institute is to train up actuaries; and no Associate can have any proper reason for belonging to the Society except that of qualifying himself for an actuaryship. If, therefore, he does not intend to offer himself for examination, the sooner he leaves the Institute of Actuaries, and joins the "Whittington Club" instead, the better.

I have to apologise for the length of this letter; but the subject is an important one, and I trust that, with the help of the Institute and of such legislative interference as may be necessary, in course of time the undue assumption of the title of actuary will be prevented, and that no longer will it be in the power of a satirist to say, as it is at present—

> "Actuarius nascitur, non fit."

I am, Sir, your obedient servant,

A FELLOW OF THE INSTITUTE OF ACTUARIES.

London, 19*th May*, 1853.

PROPER EXPRESSION FOR THE AMOUNT OF £1 WITH THE FRACTIONAL PART OF A YEAR'S INTEREST.

To the Editor of the Assurance Magazine.

SIR,—In your last Number you inserted a communication from me, "On the Period intervening between the date of Death and Payment of the Sum assured." In that communication, $(1-iA)$ was deduced as the present value of £1 due from the beginning of the year of death, and therefore of £1 with half a year's interest midway in the year of death, or with a full year's interest at the end of year of death. Consequently, on the recognised assumption that lives on an average die midway in the year of death, $\frac{1-iA}{1+\frac{i}{2}}$ would represent the present value of £1 due from the time of death. Finding upon trial that the values, when thus obtained to three places of decimals, were concurrent with those set forth by Mr. Sang in his tables, I was induced to think, in the absence of any explanation on his own part, that he must also have been led to the requisite formula already described. It appears, however, from a statement by Mr. Chisholm (*Assurance Magazine*, No. VIII.), and, more recently, from a note (alluding to my communication) appended by Mr. W. T. Thomson to the introduction of his own laborious actuarial tables, that Mr. Sang really employed $\sqrt{1+i}$ as the amount of £1 with half a year's interest, instead of $1+\frac{i}{2}$, as I had supposed.*

It is obviously to be regretted that Mr. Sang should have infected his tables with this ancient error of D'Alembert, the adoption of which by Mr. Smart in his otherwise valuable interest tables (2nd edition, 1726) had already been animadverted on (*vide* Milne, pp. 25 and 693); because if $\sqrt{1+i}$ be taken as the amount of £1 with half a year's interest, we must also take $(1+i)^{\frac{1}{n}}$ as that of £1 with $\frac{1}{n}$th of a year's interest, and therefore $\left[(1+i)^{\frac{1}{n}}\right]^n$ as the amount of £1 at interest for a year, when interest is payable $\frac{1}{n}$thly; or, in other words, the obvious mal-interpretation must be adopted, that interest payable half yearly, quarterly, monthly, or even momently, is not to be made more productive than interest

* Mr. Thomson says—"Sang, in all his assurance calculations, considered the rate of interest of half a year, not as Mr. Farren says, $\frac{i}{2}$ or ·015, but $\sqrt{1+i}$ or $\sqrt{1{\cdot}03}$."

Whatever may have been Mr. Sang's practice in Scotland, to English readers at least half a year's interest on £1000 at 3 per cent. would imply £15, and not £14. 17*s.* 9½*d.*, in consideration of the square root; especially when that square root as of 1·03 is itself really incommensurable. Neither can such a procedure have reference to the time of death; for a period described as the square root of the year of death would seem more allied to sound than sense.

It is right, however, to state that Mr. Thomson has fairly limited himself to indicating what Mr. Sang's own practice was, without enrolling himself among his disciples.

payable yearly, for $\left[(1+i)^{\frac{1}{n}}\right]^n = (1+i)$ equally for all values of n.

In my former communication, then, I was content to allow Mr. Sang the credit of having avoided this error; but, after the express testimony of his friend Mr. Thomson, we are forced upon the consideration that Mr. Sang's use of the facility of dividing the yearly logarithm, coupled with his own silence on the subject, are not circumstances wholly beyond reproach, when viewed in connection with the construction of numerical tables upon which others may have to depend.

London, May 1853. EDWIN JAS. FARREN.

ON THE SAME SUBJECT AS THE FOREGOING.

To the Editor of the Assurance Magazine.

SIR,—Observing in No. XI. of your *Magazine* a paper by Mr. E. J. Farren, containing some very neat and concise remarks "On the Period intervening between the date of Death and Payment of Sum assured," I feel called upon to say a few words on the subject, more particularly with reference to the mode in which it was treated by Mr. Sang, in the hope that you will give them a place in your pages.

I have since minutely examined the construction of Mr. Sang's Assurance Table, and am unable to discover what precise meaning he attached to the element introduced by him ($\sqrt{1{\cdot}03}$) to adjust the values for sums payable at the *instant* of death. If it was intended to express the amount of £1 with six months' interest at 3 per cent. per annum, he must have assumed the conversion of interest to be twice in the year; for a somewhat smaller rate of interest than 3 per cent. per annum, if improved half yearly, will be sufficient to bring up the quantity $\sqrt{1{\cdot}03}$ to the desired amount, 1·03, at the end of one year. In short, the half yearly rate of interest is $\sqrt{1{\cdot}03}-1$, or ·014889. But I notice that Mr. Sang, in the illustration of his published tables, in conformity with the practice and principles of previous computers, assumes the interest to be accumulated yearly, in which case the amount of £1 with six months' interest must be held to be 1·015, and not $\sqrt{1{\cdot}03}$.

This will be more evident on examination of his formula representing the value of an assurance of £1 payable at the *instant* of death, viz.—

$$\frac{v^{\frac{1}{2}}d_x + v^{1+\frac{1}{2}}d_{\overline{x+1}} + v^{2+\frac{1}{2}}d_{\overline{x+2}}}{l_x}, \text{ \&c.},$$

which is equal to

$$\frac{1}{\sqrt{1+i}} \times \left(\frac{vd_x + v^2 d_{\overline{x+1}} + v^3 d_{\overline{x+2}}}{l_x}, \text{ \&c.}\right)$$

In this formula, the quantity enclosed within ( ), being the ordinary expression for the value of an assurance payable *six months after* death (see Jones, vol. i., page 155), most clearly assumes the interest to be capitalized only once a year. Hence the other element in that expression, or $\frac{1}{\sqrt{1{\cdot}03}}$, the present value of £1 payable six months hence, at ·014889 per cent.

interest for each half year, will make the value of the assurance at the instant of death somewhat too great. It appears to me, therefore, that the symbol $\sqrt{1+i}$ is not a proper element in the consideration of this subject, in the note appended to my paper read some time ago before the Institute of Actuaries, where I took occasion to refer to this matter; but since reading Mr. Farren's paper, I am persuaded that it contains the correct solution of the problem.

I observe in the same number of the *Magazine* there is a very interesting paper "On the Valuation of Life Contingencies," by Dr. Charles Jas. Hargreave, who seems to have held views similar to those of Mr. Farren and Professor De Morgan, as to the meaning of the quantity $1-i\mathrm{A}$. In page 214 it is stated, "When we represent by $\mathrm{M}(1-\mathrm{A}_n)$ the value of a sum M payable on the death of A_n, we mean that it is payable at the commencement of the year of A's death; and if it be not payable until the end of that year, we must take a year's discount from it"—that is, we must divide it by $1+i$: and if payable at the instant of A's death, we must of course take half a year's discount, or divide it by $1+\frac{i}{2}$. It will easily be perceived that $(1-\mathrm{A}_n)$ here, and $(1-i\mathrm{A})$ in Mr. Farren's paper, are identical expressions for the value of the reversion payable at the *beginning* of the year of A's death; and I have no doubt that your readers will have observed also the singular agreement of the writers on the subject now under consideration.

The object of the present inquiry seems to me to rest on the correct determination of the discount of £1 for half a year—a matter certainly of no great difficulty; for if ·03 be the interest for one year, one half, or ·015, must be the interest for half a year, and therefore the rate supposed to be paid on the sum assured from the *instant* of death to six months after death, when the claim is settled.

The expression for the value of an assurance of £1 payable at the *instant* of death, correctly stated, will therefore be

$$\frac{1}{1+\frac{i}{2}} \times \left(\frac{vd_x + v^2 d_{x+1} + v^3 d_{x+2}}{l_x}, \text{ \&c.} \right);$$

and the most convenient form for the construction of the table, according to the mode pursued by Mr. Sang, will be to write the colog. of 1·015 or 0·0064660 on a piece of card, and add it to every value of log. v^x, adding the sum to log d_x, and then proceeding as described in my former paper. The values thus brought out will necessarily be less than those given by Mr. Sang, though after all the difference is not great, the ratio being only as 1·014889 to 1·015, or as 1 to 1·000109.* Mr. Sang's tables, therefore, though slightly erroneous in certain parts, and perhaps only in the opinion of a few, may practically be considered as valuable as ever they were, the difference being of so small moment.

At all events, Mr. Todd, in his *Investigation Tables*, having eliminated the quantity $\sqrt{1\cdot03}$ in precisely the same way in which it was introduced, has not only removed the principal objection to the use of Mr. Sang's

* That is, Mr. Sang's tables give the premiums for insuring £1000. 2*s*. 2*d*. at the *instant* of death, in place of £1000, with the values of a corresponding policy, other sums being in proportion.

tables, with reference to the value of policies, but has, in my opinion, freed them to the same extent from a slight existing inaccuracy—a consideration which perhaps should tend to make Mr. Todd's tables the more valuable.

I am, Sir,

Your very obedient Servant,

DAVID CHISHOLM.

North British Insurance Office,
Edinburgh, 27th May, 1853.

ON THE SAME SUBJECT.

To the Editor of the Assurance Magazine.

SIR,—Having recently perused the introduction to the most valuable work of W. T. Thomson, Esq., I met, in page 25, with a foot note referring to a certain paper by Mr. Farren, as inserted in the last number of your *Magazine*, and was accordingly induced to read that paper itself.

To speak candidly, I read the paper alluded to over and over again, but to my mortification could not discover the results which Mr. Farren is anxious to deduce. This circumstance causes me to apply humbly to you for an explanation on the subject, either by Mr. Farren himself or any of your mathematical readers.

First Mr. Farren says, that Simpson and Dodson imagined that De Moivre assigned $1-iA$ as the present value of £1 payable at the *end* of the year of death, while he (Mr. Farren) has reason to assert that no such error (?) could emanate from so celebrated an analyst as De Moivre—satisfying himself, that by $1-iA$ is meant the present value of £1 due at the *beginning* of the year of death. In support of his argument, Mr. Farren quotes part of a paragraph from De Moivre's work, saying, "This conclusion may be deduced from the method he (De Moivre) has adopted in solving the following problem (XVI.), as it occurs in his *Treatise on Annuities.*" Now, unfortunately, the works of Simpson and Dodson are not in my possession; but on perusing De Moivre's work itself, I must confess my inability to trace Mr. Farren's conclusions. The paragraph in question of De Moivre's, *in extenso*, runs thus :—

"*Problem* XVI.—A borrows a certain sum of money, and gives security that it shall be repaid at his decease, with the interests. To fix the sum which is then to be paid, let the sum borrowed be s; the life of the borrower, M years' purchase; d the interest of £1: then the sum to be paid at A's decease will be $\frac{s}{1-d\mathrm{M}}$; thus, supposing $s=800$, $\mathrm{M}=11{\cdot}83$, $d=0{\cdot}05$, then $\frac{s}{1-d\mathrm{M}}$ would be found $=$£1,958. In the same manner, if the sum to be paid at A's decease was to be an equivalent for his life, unpaid at the time of the purchase, that sum would be $\frac{\mathrm{M}}{1-d\mathrm{M}}=$ £2,895, supposing the annuity received to be £100, as also the life of A 11·83 years' purchase."

You will perceive that the two examples just named—rather essential in the present case—are omitted in the extract made by Mr. Farren, who,

notwithstanding, proceeds :—"From this it is *obvious* that $1-d$M, or in modern notation $1-i$A, was considered the present value of £1 at last of the 'interests,' or the beginning of the year of death, or of £1 at actual death of A, with such interest as might have already accrued for the current months and days." Here I stumble: how from this short extract it is obvious that De Moivre meant by $1-d$M the *beginning* of the year of death, I cannot conceive, unless we obtain this *obviousness* from the fact that its value in numbers agrees with the present value of £1 reversion payable at the beginning of the year of death, since there is no statement made by De Moivre to this effect. Indeed, I would rather venture to say that De Moivre gives an approximate value for the instant of death, as expressed in his own words, "to be repaid at his decease"; not—*to be repaid at the beginning of the year of his decease.* Consequently, I cannot reconcile the three terms specified by Mr. Farren to be of equal value : namely, $1-i$A= present value of £1 at last of the 'interests'=at the beginning of the year of death=at actual death of A, with such interest as might have already accrued for the current months and days. From what part of the extract are such inferences to be made? Mr. Farren further proceeds: "Now as half a year's interest is the most probable increment from *such* a source (from which source?), $\frac{1-i\text{A}}{1+\frac{i}{2}}$ will be the present value of £1 without interest (why *without* interest? or does it mean anything else?) at the instant of death, and $\frac{1-i\text{A}}{1+i}$ that of £1 without interest (the same query as the last) at the end of the year of death; consequently the ratio of the latter to the former is as $1 : \frac{1+i}{1+\frac{i}{2}}$."

Mr. Farren thus continued explaining the value of a portion of a year, saying that for half a year prior to the end of the year of death the formula becomes $\frac{1+i\text{A}}{1+\frac{i}{2}}$, which subject, as regards the tables of Sang, has already been handled by Mr. Thomson; but it may be added, that Mr. Farren could have easily discovered in the very De Moivre (3rd edition, London, 1756) that this very question was settled by the latter in his Appendix, page 340, where he *virtually* says—

"In the meantime it will be proper to know what part of the yearly rent should be paid to the heirs of the late possessor of an annuity, as may be exactly proportioned to the time elapsed between that of the last payment and the very moment of the life's expiring. To determine this, put A for the yearly rent (meaning annuity); $\frac{1}{m}$ for the part of the year intercepted between the time of the last payment and the instant of the life's failing; r the amount of £1 at the year's end: then will $\frac{r^{\frac{1}{m}}-1}{r-1}$A be the sum to be paid." This of course applies to annuities, but may be also applied in reversions.

The tables of Sang have been calculated on the same principle; and, indeed, there is no other method practicable. How would Mr. Farren, according to his own plan, solve the following problem:—

s = sum,
d = rate of interest,
a = amount,
x = period or duration.

In what time will the sum s amount to a, at d compound interest?

HERSCHELL FILIPOWSKI.

Standard Life Assurance Office,
3, *George Street, Edinburgh.*

REVIEWS OF NEW WORKS.

Actuarial Tables, Carlisle Three per Cent., Single Lives, and Single Deaths; with Auxiliary Tables. By WILLIAM THOMAS THOMSON, F.R.S.E., F.I.A., Manager of the Standard Life Assurance Company, and of the Colonial Life Assurance Company. Edinburgh: R. & R. Clark. 1853.

OUR Scottish neighbours are certainly indefatigable in their exertions for the cause of life assurance. The Carlisle Table literally groans under their folio, quarto, and octavo labours. Already we have the works of Edward Sang, Peter Gray, William Orchard, Ambrose Smith, and Benjamin Hall Todd; and now once again we have a set of actuarial tables from the pen of Mr. Thomson—a pen that really seems untiring, if we remember that already we have upon the wall, or in a portfolio, a sheet set of tabular results industriously calculated by the same gentleman. The question of *cui bono*, however, trite as it may appear, still calls for reply, and we are afraid that in the response Mr. Thomson will not, generally speaking, find that appreciation of his indomitable perseverance which it fairly demands. All secondary tables necessarily partake of the character of the primary table upon which they are founded; and great as are the excellences of the Carlisle Table in its general indications, its graduation is avowedly so faulty as to call loudly for ratification. Had Mr. Thomson achieved this upon scientific principles before undertaking his laborious task, we feel confident that his new tables would have almost wholly displaced those of his predecessors. Nevertheless, the book as it is is a highly valuable one, for, independently of the actual results, it comprises a most intelligent introduction, interspersed with several very useful hints as to the means of checking calculations. One of these is so ingenious, and so candidly mentioned in connection with the names of two concurrent computers, Messrs. Filipowsky and Gray, that we think it well to reproduce it for the benefit of our readers, referring them to the work itself as a perfect mass of proof of the success of the method.

The principle of the process is simply this—that as the logarithm of unity is zero, therefore the multiplication of reciprocals, when reduced to logarithms, necessarily produces zero. Thus, if the present value of £1,

due n years hence, be considered as put out at interest for n years in succession, it is obvious that at the nth it will become £1, of which the logarithm is zero. In like manner, if the probability of living n years be taken and be multiplied by the reciprocal probability for each year, it is also clear that the sum of the logarithms will be zero, for log. $(1)^n = 0$.

The work is beautifully got up in quarto, and reflects no less degree of credit upon the author's printers than upon himself.

Popular Tables, arranged in a new form, giving information at sight for ascertaining, according to the Carlisle Table of Mortality, the value of Lifehold, Leasehold, and Church Property, Renewal Fines, &c.; the Public Funds, Annual Average Price and Interest on Consols from 1731 *to* 1851; *also, various interesting and useful Tables, equally adapted to the Office and the Library Table.* By CHARLES M. WILLICH, Actuary and Secretary to the University Life Assurance Society. Third Edition. London: Longman, Brown, Green, & Longmans. 1852.

THOSE who are in the habit of referring daily to the class of tables above described, will find this one of the most useful and practical works of the kind. It is not encumbered with a multitude of tables which are only occasionally consulted, and therefore recommends itself the more to that numerous class of educated persons who, requiring an estimate of the value of property on lives or leases, and of fines for renewals, can find the results sufficiently near for all practical purposes. Two very useful tables will be found in pp. 55 to 59, for renewing with one or two lives a lease originally granted on three. In all these cases the Carlisle Table is used, as more nearly representing (the author appears to think) the general mortality than any other in general use, notwithstanding certain well known imperfections in it. Another very convenient table is one contributed by Mr. Peter Hardy, enabling those "who wish to enjoy a certain high rate of interest on their investments, while from the state of the money market they can only reinvest the surplus income at a low rate of interest in order to replace the capital expended," to ascertain the present worth of a lease, estate, or annuity, at different rates of interest. Amongst the miscellaneous tables will also be found a great variety of interesting matter, constantly sought after, relating to such subjects as income tax, calculation of wages, the average price of the Funds and the interest they have produced for the last 120 years, tithe commutation, coins and currency, weights and measures of different countries, and scientific constants, and a short but very convenient table of logarithms.

In the third edition Mr. Willich has introduced a table of hyperbolic logarithms, extending to them a new method proposed by him in the first, for obtaining logarithms of high numbers without trouble and with perfect accuracy; also some trigonometrical, astronomical, and chronological tables, concluding with a very curious one, affording easy means of extracting the roots of perfect cube numbers not exceeding nine digits, and supposed to involve the method by which the so called American calculating boy achieved that operation with such surprising facility. Mr. Willich's labours appear to have received the approval of some of our most eminent mathematicians; and that they are highly appreciated by the public is, we think, sufficiently evidenced by the fact that a work of this peculiar kind has already reached a third edition.

REPORTS OF ASSURANCE COMPANIES.

Edinburgh Life Assurance Company.—Twenty-ninth Annual General Court, held on the 14*th December*, 1852.—A report by the directors, for the year ending 31st August, 1852, was read to the meeting, containing the gratifying announcement of a large increase both in the number and amount of new insurances, and the progressive improvement in all the branches of the Company's business.

The report was unanimously approved of, and the following resolutions were announced as having been adopted by the directors, by which the present and future policyholders shall enjoy the following privileges:—

First. All policies that have subsisted for five years shall thereafter be free from objection on the ground of any informal or incorrect statements in regard to the health or habits of the parties assured.

Second. All persons engaged in military or naval service, and all persons serving in the militia, shall be at liberty so to serve without extra premium, and without the necessity of obtaining licenses, so long as they remain within the United Kingdom of Great Britain and Ireland.

Third. In all assurances held *bonâ fide* upon the lives of others, policies shall be free from forfeiture on account of acts or deeds of the parties whose lives are assured, provided the ordinary premiums be duly paid, and the premiums for extra risk, whenever these are ascertained.

Engineers,' Masonic, and Universal Mutual Life Assurance Society.—Report for the year 1852.—The directors report to the members that during the year 1852 they have received 333 proposals for assurance, of which 251 have been completed, assuring the sum of £60,380, and producing annual premiums to the amount of £1,975. 11*s.* 2*d.* Forty-eight proposals, for the assurance of £15,900, have been declined, and thirty-four, for the assurance of £7,150, stand over for completion or further consideration. The net income from premiums alone is £10,051. 15*s.* 5*d.*, after deducting short term, purchased, and lapsed policies, and those under which claims have arisen. The amount derived from these sources since the commencement of the Society's operations has been £4,818. 2*s.* 7*d.*, while the claims from death have been but £3,900. The number of deaths among the members during the past year has been five, to the amount of £1,200; but the calculations of the tables, at the average age of the whole of the assured, would have led to the expectation of fourteen deaths.

Cash Account for the year ending December 31*st*, 1852.

Dr.	£.	*s.*	*d.*
To cash balance from last year	2,147	2	0
„ Premiums	9,883	12	5
„ Loan investigation fees	69	15	10
„ Repayments of loans	3,097	2	11
„ Deposit account	2,428	14	10
„ Purchase-money for annuities	1,500	0	0
	£19,126	8	0

Cr.	£.	*s.*	*d.*
By expenses of head office	3,719	18	5
„ „ of branch offices and agencies	838	1	3
Carried forward	£4,557	19	8

		£.	s.	d.
Brought forward		4,557	19	8
By medical referees' fees		279	15	6
„ Policy stamps		156	18	9
„ Commission		461	5	10
„ Interest		238	2	9
„ Reassurances		274	11	7
„ Policies purchased		123	18	7
„ Annuities		22	13	4
„ Claims		1,200	0	0
„ Furniture and fittings		35	13	3
Cash balance	£4,984 14 8			
Policy stamps on hand	6 7 6			
Invested on security	6,784 6 7			
		11,775	8	9
		£19,126	8	0

A General Statement of the Affairs to December 31*st*, 1852.

Dr.	£.	s.	d.
To advances by directors	4,186	15	0
„ Deposit account	8,344	4	2
„ Present value of risks on policies in existence, December 31, 1852	142,793	1	7
„ Present value of annuities	1,425	0	4
Balance in favour of Society	32,043	9	6
	£188,792	10	7

Cr.	£.	s.	d.
By present value of annual premiums payable on policies in existence, December 31, 1852	172,317	9	9
„ Furniture, head office and branch offices, less 30 per cent. for deterioration	682	7	3
„ Amount due on investments	7,987	10	5
„ Amount due on policies	2,814	1	0
„ Cash at bankers	4,984	14	8
„ Policy stamps on hand	6	7	6
	£188,792	10	7

Statement of Policies completed.

	In 1852.	Total to 31st Dec., 1852.
£2,000 and upwards	1	13
1,000 and under £2,000	9	88
500 „ 1,000	27	213
200 „ 500	96	557
100 „ 200	108	649
Under 100	10	134
	251	1,654

English and Cambrian Assurance Society.—First Annual General Meeting, held 26*th July*, 1851.—The report stated that the number of proposals received up to the 12th instant has been 432, amounting to £99,415, of which—

		£
273	have been accepted and completed, averaging £259, and assuring	70,695
29	ditto ditto, but not completed	4,650
62	have been declined or withdrawn	13,780
68	under consideration	10,290
432		£99,415

The Society's income to the present time is £2,328. 1*s.*

The directors, under the powers contained in their deed of settlement, deemed it prudent in December last to suspend the fire department of the Society's business, and accordingly the risks (with the exception of two) were transferred to a highly respectable Office, for which the Society is still liable. When the proper period arrives, the directors will ask the sanction of the shareholders to resume this department of business, of which due notice will be given.

The directors report that, up to this date, no claims have fallen in by reason of death, and no losses have been sustained in the loan department.

The directors recommend that a dividend, at the rate of 5 per cent., up to the 30th April last, be paid to the shareholders upon the amount of their respective shares.

Balance-sheet, ending June 30, 1851.

Dr.		£.	s.	d.
To cash received for deposits on 4235 shares and for advances on securities		10,741	19	1
Ditto received for life premiums		1,142	1	7
Ditto repayment of loans by sundry persons	£3,876 11 6			
Ditto received for interest on loans	75 3 1			
		3,951	14	7
		£15,835	15	3

Cr.		£.	s.	d.
By preliminary expenses previous to the complete registration of the Society, including printing, stationery, advertisements, law charges for preparing deed of settlement, registration fees, stamps, actuarial charges, and £500 allowed to the directors, by clause 92 of the deed		2,279	3	1
Charges of management and office expenses—				
Rent	£132 19 2			
Law charges	37 2 0			
Printing and stationery	24 9 1			
Advertisements	129 11 0			
Salaries	521 17 0			
Directors' fees	441 18 0			
Rent of district offices, and agents' salaries, messenger's wages, postages, parcels, gas, coals, taxes, and sundries	584 17 5			
		1,872	13	8
Commission		116	19	7
Medical fees		54	12	0
Travelling expenses for establishing agencies		264	3	0
Reassurance		133	9	0
Premises, alteration of	944 11 7			
Furniture and fixtures	313 18 7			
		1,258	10	2
Loans granted to sundry persons		7,538	0	8
Cash due by agents	291 14 3			
Cash due on calls unpaid	697 5 0			
Policy stamps on hand	77 11 6			
Petty cash on hand	4 6 4			
Balance at bankers	1,247 7 0			
		2,318	4	1
		£15,835	15	3

English and Cambrian Assurance Society.—An adjourned general meeting of the shareholders in this Company was held October, 1851, to

consider the report of a committee of nine, which had been appointed at the general meeting to consider the claim of Mr. James Henry James and Mr. Atwood Henry Smith, the promoters of the Company (the latter also the late solicitor), and also to report on the propriety of allowing an item of £500 charged by the directors for their services. It will be seen from the report that was presented by Mr. Bevan, the secretary, that it was adverse to Mr. Smith's claim, and in favour of the allowance of £500 to the directors.

Report of the Committee appointed at the Annual General Meeting of the English and Cambrian Assurance Society, held at the Society's Office, Bridge Street, on the 26th July, 1851.

"Your committee met on the 11th of August last, in pursuance of due notice, and Mr. Atwood Henry Smith then attended before them and submitted a claim that the ownership of the house No. 9, New Bridge Street, Blackfriars, be restored to him as on the 24th December, 1849, and that he would reimburse the Society their outlay on it, or that the office of solicitor to the Society be restored to him as on 27th May, 1850, or compensation by payment of the value of the lease. That your committee heard Mr. Smith at great length in support of his claim, and carefully inspected the several documents which he produced, and also the minutes of the Society relating to the subject under inquiry, and also the deed of settlement of the Society, and the deed of trust relating to the said lease, and the correspondence and other papers which were submitted to them; and having, at the request of Mr. Smith, adjourned the committee to the 18th of August, 1851, in order that he might produce Mr. Taylor, although your committee consented to receive Mr. Smith's statement of all that Mr. Taylor could state as true; and having accordingly met by adjournment and heard Mr. Taylor's statement; and Mr. Smith having brought before your committee further documents, and again addressed your committee at considerable length, your committee were fully satisfied that Mr. Smith had been liberally paid for all that he had done for the Society, and that he had no ground of claim against the Society in respect of the lease or of the premises, or the office of solicitor, or to any compensation, and accordingly resolved—

"'That from the evidence heard before the committee, it does not appear that Mr. Smith has any claim against the Society.'

"That your committee again met on the 9th September, 1851, and having examined the item of £500 charged in the balance-sheet as remuneration to the directors for their services in the formation of the Society, and the minutes relating thereto, and the deed of settlement, and deliberated thereon, resolved—

"'That the item of £500, being the amount of remuneration to the directors for their services prior to the complete registration of the Society, do stand as charged in the balance-sheet.'

"Mr. Ball attended the same day before your committee, and submitted a claim to remuneration as one of the original promoters of the Society; and your committee, having heard his statement, and inspected all the documents and minutes relating thereto, resolved—

"'That the 25 shares awarded to Mr. Butts for his services in the formation of the Society, per minute of 17th April, 1850, be confirmed.'

"A letter from Mr. Woollett, in which he claimed compensation of 150 shares, with one pound paid upon each, was then submitted to your committee and was fully considered; and Mr. James attended then before your committee and submitted his claim of 50 guineas for tables, and 150 shares with one pound paid up on each; and Mr. Angus afterwards attended before your committee and submitted his claim of 150 shares, with one pound paid up on each. And your committee, having heard the several statements of these gentlemen, which were made with candour, and having inspected the various minutes and documents to which they referred, and the deeds which those gentlemen had entered into with the Society relating to such claims, and having given the whole case their best and candid consideration, resolved—

"'That neither Mr. James, Mr. Woollett, nor Mr. Angus, are entitled to any compensation as claimed by them.'

"And your Committee report accordingly.

"Signed on behalf of the Committee,

"CHAS. BURFIELD, Chairman."

Mr. Smith objected to the reception of the report on the ground that it was not signed by the members of the committee, but by the chairman on their behalf; and having made this objection formally, he withdrew. The report was then, on the motion of the chairman, seconded by Mr. Lawrence, unanimously agreed to. Mr. Lawrence took the opportunity of congratulating the shareholders on the satisfactory progress of the Company, 500 shares having been taken and 35 policies issued since the general meeting, a period of two months. A vote of thanks was then given to the committee and chairman, which concluded the business of the day.—*Post Magazine.*

English and Cambrian Assurance Society.—12*th Nov.*, 1851.—An extraordinary general meeting of this Society was held, for the purpose of electing additional Directors and making certain alterations in the deed of settlement.

The chairman then briefly adverted to the purpose of the meeting, and pointed out the necessity that existed to alter several clauses in the deed of settlement, which he would read *seriatim*, and explain as he proceeded. The first clause proposed to be altered was the 13th, which gave power to policyholders of £100 to attend and vote in all the affairs of the Society, which the directors considered should either be totally abolished or limited to a larger amount.

The clause was then read, whereupon, some objections having been made by policyholders, a director said the directors of course would be guided by the wishes of the meeting; and as it seemed to be the general impression that this clause ought not to be disturbed, they were quite ready to withdraw the proposed alteration.

The motion was accordingly withdrawn.

The manager said the next clause proposed to be altered was the seventeenth, which related to the number of shareholders who should constitute an extraordinary general meeting. At present the clause required that thirty shareholders should be in attendance before any business could be done; but as the majority of the shareholders lived in the country, there was great difficulty in getting so many together. It was therefore proposed to reduce the number from thirty to twelve, who should represent £600 instead of £1000 of the Company's capital.

Another director said the next clause proposed to be altered was the twentieth. The meeting was aware that if any vacancies occurred at the board between the ordinary general meetings, the directors had no power to fill them up without calling an extraordinary meeting for the purpose. Now it was proposed that the clause should be so altered that the directors should have authority to appoint new directors to fill up vacancies, without calling an extraordinary meeting, whose election should be subject to the approval of the proprietors at the next general meeting. It was also proposed to take power to increase the number to fifteen, if it should be so thought fit.

A proprietor asked if that would not add to the expense, and was answered that the maximum remuneration of the directors had already been fixed; and, of course, the more new directors the present board appointed, the less they would receive, which was an excellent guarantee to the proprietors that none would be appointed unless they were absolutely required. It was also proposed to increase the qualification of each director from 50 to 100 shares.

A resolution embodying the proposed alterations was then moved from the chair, and carried unanimously.

The manager said, the next clause proposed to be altered, which was No. 42, had reference to the preceding clause, and it provided that no proprietor should be eligible for election to a seat at the board unless he had held £50 worth of stock for six months previously—a condition which had operated very prejudicially to the interest of the Company, since it not unfrequently happened that a man of eminence and standing in the commercial world was disposed to join them, but he could not do so, owing to this restriction, under six months. It was proposed to alter the clause so that a proprietor who held 100 shares should be eligible ten days after he had signed the deed of settlement.

A resolution authorizing this alteration was proposed from the chair and carried unanimously.

The same director said, clause 44 was admitted to be an error in the original deed, and the clause as it now stood was contrary to the Act of Parliament. Speaking of the persons eligible to be elected as directors, it referred to them as "duly qualified policy and shareholders." Now, inasmuch as the Act of Parliament restricted the directors to shareholders only, this was clearly a mistake, and it was therefore proposed to remedy it by striking out the word "policy."

A resolution authorizing the alteration was then proposed and carried unanimously.

The same director said, the next clause proposed to be altered was the one relating to the qualification of auditors. It provided that the auditor, previous to his election, should have been a holder of 10 shares for six months previously; and it was now proposed to reduce the time to 10 days, and increase the number of shares to 25.

The proposal was then put to the vote and carried unanimously.

The same director said, by clause 157 no proprietor could hold more than £500 worth of stock. It was proposed, however, to repeal that clause, and allow anyone to hold as many shares as he thought proper.

A resolution was passed, like the others, authorizing this clause to be struck out.

The same director said he had another clause to suggest to the meeting. As the deed of settlement stood then, there was no power to cancel shares; and it was proposed to insert a clause, providing that in the event of the calls on any shares remaining unpaid for a certain time, or the holders of any shares becoming insolvent, the directors should have power, after due and proper notice, to cancel such shares.

A proprietor apprehended that there would be no objection to extend the period for payment, if the party holding the shares applied for it?

The chairman—None whatever.

A resolution was then passed sanctioning a clause to authorize the directors to cancel all shares which should remain in arrears for six months.

The chairman announced that under the existing laws of the Society it would be necessary to hold a *pro formâ* meeting this day fortnight, to confirm the alterations.

The manager then stated the exact position of the Society and the progress which it had made since last meeting. Since the 26th of July last (the annual meeting) the directors had issued 1,000 shares, and up to the

12th of November instant had received 141 proposals for policies, 106 of which had been accepted. Of those proposals 98 were accepted at the ordinary rates, and 11 declined. Twenty-four are now waiting for examination, and yesterday as many as 20 proposals were brought before the board. The number of policyholders is now 360. Since the month of June they had received 53 proposals from Norwich alone, nearly all of which, at the present moment, have been completed. The income from that branch alone produces upwards of £200 a year.

English and Cambrian Life Assurance Company.—Third Annual Meeting, held 29th July, 1852.—The chairman stated that the directors had appointed Mr. Kingsford, who had been 12 years connected with the Economic, in place of their late secretary and manager, Mr. C. W. Bevan. The present qualification of the directors was not nominal, but absolute; and as they considered the possession of 100 shares an insufficient qualification, they had increased it to £200, which sum they had paid in money. New tables had been constructed. The expenditure had been considerably reduced, and might now be taken at £2000 a year, their income from premiums being £2,500. Since May, assurances to the extent of £10,000 had been effected. One policy for £50 had become a claim.

Era Life and Fire Insurance Company.—First Annual Meeting, held 28th of April, 1853.—The following is the balance-sheet:—

Dr.		£. s. d.
To capital		8,355 15 0
Paid-up capital	£3,183 5 0	
Deposits	1,037 10 0	
Loans	4,135 0 0	
	£8,355 15 0	
Life premiums		1,803 15 5
Fire premiums		125 8 11
Duty due to Government		69 1 6
Guarantee fund		35 17 6
Creditors—for proportion of current rent and salaries		143 12 8
		£10,533 11 0

Dr.		£. s. d.
Preliminary expenses		1,992 12 9
Leasehold property		400 19 6
Furniture, and fittings-up of offices		752 6 6
Charges of management		1,033 14 1
Commissions		130 9 8
Reassurances—life		96 14 6
Ditto fire		105 0 6
Stamps		19 15 3
Medical fees		28 0 9
Law charges		36 4 6
Interest		30 12 1
Investments on mortgage, &c.		4,075 3 6
Agents' balances		683 11 8
Cash—London bankers	£1,041 16 3	
Norwich ditto	30 6 11	
In house	76 3 2	
		1,148 6 3
		£10,533 11 0

The report stated that the deed of settlement was completely registered on the 28th February, 1852; but from various delays the working operations of the Society had not extended over more than nine months.

The number of proposals in the life department to the 28th February last were 297, for sums amounting to £76,562. 10*s.* 9*d.* Of these, 261 have resulted in policies, assuring in the aggregate £58,202. 10*s.* 9*d.*, and producing an annual income of £1,803. 15*s.* 5*d.*; the number of life proposals declined being 36, for a sum of £18,360.

In the fire department, 185 proposals were received and accepted, covering assurances for £84,395, and producing a yearly income of £125. 8*s.* 11*d.*

No claim in respect of assurances has arisen, except one of 4*s.* on a fire risk.

The chairman stated that the Society commenced operations on the 20th April, 1852. The actual number of shares on which the deposit was paid was 8,154. A balance of £500 remained for the year, after defraying all expenses. The entire expenses of management had not absorbed more than £1,033, of which £700 was paid in salaries.

Equitable Life Assurance Society.—General Cash Account for the Year ending 31*st December*, 1850.

Dr.	No. of Policies.	Sums assured.	Cash received. £.	s.	d.
		£			
Received for assurances on single lives	126	135,300	5,653	8	0
On the joint continuance of two lives	1	200	9	12	6
Survivorship annuities	2 £675		240	2	0
Amount of new assurances	129	135,500	5,903	2	6
		£675 annuities			
Entrance money			435	7	6
Policy money			325	15	0
Extra premiums for sea risk and residence out of Europe			613	18	0
Commuted premiums			7,077	9	6
Arrears of premium and interest on policy No. 19,858, on account of error in statement of age			185	6	0
Annual premiums on old assurances			232,785	19	6
Forfeits			106	10	0
Dividends on stock			150,977	10	0
Interest on mortgages			133,084	17	4
Interest on Exchequer Bills			1,430	19	6
			532,926	14	10
To a further dividend from the estate of Messrs. Boldero & Co.			28	10	11
To cash repaid which had been lent on mortgage			317,060	19	7
To the produce of £20,000 stock sold out of the 3 per cent. Consolidated Bank Annuities			19,587	10	0
To the produce of £50,000 stock sold out of the 3 per cent. Reduced Bank Annuities			47,968	15	0
To the produce of £107,000 stock sold out of the 3¼ per Cents.			104,840	12	6
To the produce of £100,000 Exchequer Bills sold			104,364	5	4
Bank note found in the office			5	0	0
To balance brought from the 31st December, 1849			197,119	1	7
			£1,323,901	9	9

Stock in the Funds—

£2,255,000 in the 3 per cent. Consols } £4,915,000 3 per Cents.
£2,660,000 in the 3 per cent. Reduced }

Exchequer Bills, £40,000.

Cash on mortgage, £3,539,785. 18*s.* 8*d.*

Cr.	Lives.	No. of Policies.	£.	s.	d.	£.	s.	d.
By claims paid on policies included within the privileged number of 5000 . .	199	252	348,500	0	0			
By claims paid on policies not included in the above number . . .	5	5	7,100	0	0			
	204	257				355,600	0	0
By additions to claims						398,429	3	6
						754,029	3	6
By annuities to claimants			1,734	17	0			
By ditto paid pursuant to orders of the general court .			100	0	0			
						1,834	17	0
By income tax—								
On dividends on stock . £4,403 10 2								
On interest of mortgages . 3,881 12 8						8,326	17	6
On interest of Exchequer Bills 41 14 8								
By returns of premiums and forfeits						454	18	6
By sundry disbursements, viz.—								
General expenses			643	1	6			
Rates and taxes			259	2	0			
Stamps			750	13	6			
Stationery for the year 1849			78	10	3			
Upholsterer's work, ditto			33	19	0			
Painter's and glazier's work, ditto			39	6	9			
Assessor of the City of London for income tax on salaries			150	4	2			
Directors' attendances for the year ending 2nd May, 1850 . . . . . £2,000 0 0								
Less income tax 58 6 8								
			1,941	13	4			
Auditors for the year 1849			126	0	0			
Printing			160	5	6			
Law charges (ordinary) for the years 1848 and 1849 .			287	1	7			
Ditto, on transfer of mortgages (2)			262	13	2			
Coal			28	17	0			
Ground rent			135	18	4			
Salaries			3,195	0	0			
						8,092	6	1
						772,738	2	7
By cash paid for surrendered policies—								
Lives 34 O.S. 41								
" 47 N.S. 54								
—81 —95						148,505	0	6
By cash paid for £260,234. 10*s.* additions surrendered . . .						183,630	0	0
By £40,000 Exchequer Bills purchased						41,772	10	0
By cash advanced on mortgage						103,500	0	0
By £30,000 stock purchased in the 3 per cent. Reduced Bank Annuities						28,818	15	0
By balance remaining on the 31st December, 1850						44,937	1	8
						£1,323,901	9	9

Equitable Life Assurance Society.—At the quarterly general court of the above Society, held 5th June, 1851, the accounts for the period ending the 31st of March, 1851, as reported by the auditors, were presented. It appeared from this document that the number of new assurances effected was 35, for an amount of £31,200. The claims paid represented £86,800, and the bonuses thereon were to the extent of £109,910. The amount of stock sold was £210,000, Three per Cent. Reduced. It also appeared that the Society had invested on mortgage £130,000, and for the redemption of policies and bonuses £16,514, leaving a cash balance at the bankers of £39,479. The actuary then made his annual report of the policies that

had been admitted in the course of the past year to make up the constantly participating number of 5,000. The number admitted was 309, which included a policy dated in June, 1845; and he stated to the meeting that the amount of liabilities discharged in the course of the last year was upwards of £1,300,000, effected by an absorption of £422,000 of the capital. The entire remaining liabilities on the 31st of December last amounted to £12,730,000, to meet which the Society then possessed a present capital of £8,330,000, in addition to an income from the premiums of assured members of £235,000 a year. In the course of the proceedings a member moved for a committee to investigate the affairs of the Society, which, after some debate, was negatived by a large majority.

Equitable Life Assurance Society.—General Cash Account for the Year ending 31st December, 1851.

Dr.	No. of Policies.		Sums assured. £.	Cash received. £.	s.	d.
Received for assurances on single lives	101		94,950	2,905	6	0
Annuities after an assigned time	3	£189		137	14	6
Survivorship annuity	1	30		22	0	0
Amount of new assurances	105		94,950	3,065	0	6
		£219 annuities.				
Entrance money				256	11	6
Policy money				236	7	6
Extra premiums for sea risk and residence out of Europe				624	18	0
Commuted premiums				1,763	12	0
Annual premiums on old assurances				226,412	5	6
Forfeits				108	14	0
Dividends on stock				138,600	0	0
Interest on mortgages				130,421	3	0
Interest on Exchequer Bills				910	0	0
To cash repaid which had been lent on mortgage				49,611	0	0
To the produce of £80,000 stock sold out of the 3 per cent. Consolidated Bank Annuities				77,350	0	0
To the produce of £300,000 stock sold out of the 3 per cent. Reduced Bank Annuities				291,262	10	0
To balance brought from the 31st December, 1850				44,937	1	8
				£965,559	3	8

Stock in the Funds—

£2,175,000 in the 3 per cent. Consols } £4,535,000 3 per Cents.
£2,360,000 in the 3 per cent. Reduced }
Exchequer Bills, £40,000.
Cash on mortgage, including £1,000 secured by the assignment of a claim for that amount by a son of one of the mortgagors, £3,632,174. 18*s.* 8*d.*

Cr.	Lives.	No. of Policies.	£.	s.	d.
By claims paid on policies included within the privileged number of 5,000	174	210	316,720	0	0
By claims paid on policies not included in the above number	2	2	7,000	0	0
	176	212			
By additions to claims			395,299	1	0
By annuities to claimants			1,717	18	0
By ditto paid pursuant to orders of the general court			100	0	0
Carried forward			£720,836	19	0

			£.	s.	d.
By income tax—		Brought forward	720,836	19	0
On dividends on stock	£4,042 10 0				
On interest of mortgages	3,817 11 8		7,886	12	6
On interest of Exchequer Bills	26 10 10				
By returns of premiums and forfeits			318	9	6
By sundry disbursements, viz.—					
General expenses			577	3	4
Rates and taxes			221	7	2
Stamps			512	17	6
Stationery for the year 1850			82	18	1
Painter's and glazier's work, ditto			65	18	3
Law charges for the year 1850			334	1	2
Printing for ditto			104	4	6
Assessor of the City of London for income tax on salaries			144	0	3
Directors' attendances for the year ending 1st May, 1851		£2,000 0 0			
Less income tax		58 6 8			
			1,941	13	4
Auditors for the year 1850			126	0	0
Coal			37	11	6
Ground rent			135	18	4
Salaries			3,120	0	0
By cash paid for surrendered policies—Lives	2 O.S. 2				
" " "	37 N.S. 42				
	— 39	—44	15,877	4	0
By cash paid for £79,957 additions surrendered			57,574	10	0
By cash advanced on mortgage			142,000	0	0
By balance remaining on the 31st December, 1851			13,661	15	3
			£965,559	3	8

Equitable Life Assurance Society.—A special general meeting was held on the 17th of June, 1852, to take into consideration the following proposition:—"That it be referred to a committee of five of the assured before the 1st of January, 1817, and five since that date, to investigate and report upon the state of the Society, and whether any plan can be recommended for more effectually carrying out the original principles on which the Society was constituted, in a manner which will be advantageous to those at present assured, and inviting to the public; and that such report be presented at one of the quarterly courts to be held in September or December next, or at a court to be called by the actuary, specially for the purpose of receiving and considering such report; and that such committee shall have power to call for any evidence they may think necessary in the course of such investigation."

In the course of a long discussion it was urged by some of the members, that unless some alterations were made in the constitution and laws of the Society, and fresh attractions held out to the public to become members of it, the position of the Society—the capital of which, nevertheless, amounted to £8,000,000—would be endangered by the small number of new insurers, amounting last year to no more than 105, as well as by the large number of members, among whom it is stated that there are no less than 600 persons of the ages of 70 and upwards, whose lives would naturally drop in within the course of a few years. On behalf of the board, it was urged that the frequent discussion of these subjects was much to be deprecated, as leading to no good results—the effect being, that insurances in the Society had been objected to in consequence of the reported disagreements amongst its members. The opinion of the present Lord Chancellor, which was given at a previous meeting some years ago, and which declared the illegality of interfering with the policies of those insured previous to 1817, was much dwelt

upon, and it was alleged that any alterations in the terms under which those policies are held, would probably lead to proceedings in the Court of Chancery. On a division the proposition was negatived by a majority of 64 to 25.

Equitable Life Assurance Society.—General Cash Account for the Year ending 31*st December*, 1852.

Dr.	No. of Policies.		Sums assured. £.	Cash received. £.	s.	d.
Assurances on single lives	112		140,260	5,123	2	6
On the longest of two lives	3		1,900	31	18	6
Annuities after an assigned time	4	£292		146	10	6
Survivorship annuities	2	100		146	17	0
Amount of new assurances	121		142,160	5,448	8	6
		£392 annuities.				
Entrance money				371	3	6
Policy money				305	7	6
Extra premiums for sea risk and residence out of Europe				705	6	2
Commuted premiums				2,334	14	0
Annual premiums on old assurances				218,254	5	6
Forfeits				120	0	0
Dividends on stock				124,200	0	0
Interest on mortgages				136,833	6	7
Interest on Exchequer Bills				910	0	0
				489,482	11	9
To cash repaid which had been lent on mortgage				17,000	0	0
To the produce of £40,000 Exchequer Bills sold				41,887	10	0
To the produce of £280,000 stock sold out of the 3 per cent. Consolidated Bank Annuities				273,950	0	0
To the produce of £400,000 stock sold out of the 3 per cent. Reduced Bank Annuities				394,143	15	0
To a further dividend from the estate of Messrs. Boldero & Co.				80	11	4
To balance brought from the 31st December, 1851				13,661	15	3
Stock in the Funds—						
£1,895,000 in the 3 per cent. Consols } £3,855,000 3 per Cents.						
£1,960,000 in the 3 per cent. Reduced }						
Cash on mortgage, including £1,000 secured by the assignment of a claim for that amount by a son of one of the mortgagors, £4,070,444. 18*s.* 8*d.*						
				£1,230,206	3	4

Cr.	Lives.	Policies.	£.	s.	d.	£.	s.	d.
By claims paid on policies included within the privileged number of 5000	O.S. 81	104						
	N.S. 82	99						
	163	203	311,433	12	0			
By claims paid on policies not included in the above number	8	12	16,128	19	0			
	171	215				327,562	11	0
By additions to claims						362,619	19	0
						690,182	10	0
By annuities to claimants			1,482	3	0			
By ditto, paid pursuant to orders of the general court			100	0	0			
						1,582	3	0
By income tax—								
On dividends £3,622 10 0								
On interest of mortgages 3,990 18 10						7,639	19	8
On interest of Exchequer Bills 26 10 10								
Carried forward						£699,404	12	8

				£.	s.	d.	£.	s.	d.
Brought forward							699,404	12	8
By returns of premiums and forfeits							681	0	6
By sundry disbursements, viz.—									
General expenses				666	6	3			
Rates and taxes				275	3	6			
Stamps				773	3	6			
Stationery for the year 1851				97	13	5			
Painter's and glazier's work ditto, including painting outside of the Society's house				89	14	7			
Law charges (ordinary) for the year 1851				174	11	7			
Ditto on mortgage account				155	8	5			
Printing for 1851				42	14	6			
Assessor of the City of London for income tax on salaries				142	18	4			
Directors' attendances for the year ending 29th April, 1852	£2,000	0	0						
Less income tax	58	6	8						
				1,941	13	4			
Auditors for the year 1852				131	5	0			
Coal				35	2	0			
Ground rent				135	18	4			
Repair of hot water apparatus in strong-rooms				65	0	0			
Upholstery and upholsterer's work				118	14	10			
Salaries				3,057	10	0			
							7,902	17	7
							707,998	10	9

			Lives.	Policies.			
By cash paid for surrendered policies	Included in 5,000	O.S.	5	6			
		N.S.	26	31			
			—31	—37			
	Not included		4	4			
			35	41	22,208	13	0
By cash paid for £14,023 additions surrendered					10,173	14	6
Cash laid out on mortgage					455,270	0	0
Balance remaining on the 31st December, 1852					34,565	5	1
					£1,230,206	3	4

Equity and Law Life Assurance Society (1844).—*Fourth Annual Meeting, held March,* 1851.—The report stated that the amount assured in 1850 was £131,624, producing an annual income of £3,786. 11*s.*, being an excess over the preceding year of £6,140 in the amount assured, and of £281. 7*s.* 4*d.* in the amount of premiums received. The average rate of premiums on the policies completed in the year is £2. 17*s.* 8*d.* per cent., and the average amount assured by each policy about £920. Only two claims have occurred—one for £2,000, the other for £100. Two claims, the amount of which was reserved in the calculations for profits on 31st December, 1849, have also been paid—one for £4,000, reduced by reassurance to £3,000; and one for £1,000, reduced by compromise, satisfactory to the party making the claim, to £500.

The business of the Etonian and General Life Assurance Society has been transferred to this Society. The number of policies thus transferred is 117, assuring £45,346. 5*s.*, and producing in annual premiums £1,734. 19*s.* 7*d.* On the transfer, the Etonian Society paid £1,343. 10*s.* 6*d.*—a sum which, according to a careful calculation of the actuary, is a fair consideration for undertaking the risks of that Society. On the other hand, this Society paid £299. 3*s.* 4*d.* for the goodwill of the Etonian business. An addition to the board is recommended from the list of the directors and officers of the Etonian Society. It is also recommended that the

number of the board should be increased to 24. The total amount assured by this Society up to the 31st December last was £743,420, of which £627,054, yielding an annual income of £18,049. 0*s.* 2*d.*, is still assured, independently of the amount assured by the policies transferred from the Etonian Society. The directors have, up to 31st December last, reassured all risks above £3,000; but they consider that the time is now come when they may prudently undertake risks of £4,000, in cases exceeding which amount only will reassurances be effected. The number of reassurances existing on the 31st December last was 59, covering an aggregate risk of £94,139. 17*s.* The dividends on stock and interest on mortgages received during the year 1850 amounted to £3,024. 14*s.* 7*d.* The interest paid to proprietors was £1,443. 9*s.* 2*d.*, leaving an accumulated balance from this source of £1,581. 5*s.* 5*d.* The property of the Society amounts to £82,665. 11*s.* 11*d.*—that is, £34,285. 11*s.* 11*d.* above the sum of £47,680 received for deposits on shares; the surplus capital thus exceeding that of 1849 by £7,632. 1*s.* 4*d.*, after paying £1,715. 5*s.* in lieu of the reversionary bonus on the division of profits. The income of the Society for 1850 was £21,073. 14*s.* 9*d.*

Equity and Law Life Assurance Society.—Fifth Annual General Meeting, 19th March, 1852.—The report stated that the total amount assured in 1851 was £162,075, producing an annual income of £4,764. 4*s.* 5*d.*; in addition to which there were proposals, declined, or from other causes not completed, amounting to £24,790. The average rate of premiums on the assurances completed during the year was £2. 18*s.* 10*d.* per cent., showing that the lives are generally young and unexceptionable; the average amount of the policies was about £783. The total amount of assurances effected to the 31st December, 1851, was £905,495, of which £748,726 is still assured, yielding an annual income of £20,859. 10*s.* 8*d.* The directors, to the end of 1850, effected reassurances in all cases of risk exceeding £3,000. At the beginning of the year 1851 they were induced to relax that rule, by retaining risks to the extent of £4,000. At the commencement of the present year they determined to increase that amount to £5,000, being of opinion that the success of the Society and its present position fully justified the step; so that in future reassurances will not be effected except in cases of risk exceeding £5,000, by which a considerable annual expenditure will be saved. The number of reassurances existing on the 31st December last was 57, covering an aggregate risk of £90,042. The investments of the Society on the 31st December last amounted to £98,391. 6*s.* 5*d.*, being an excess of £50,351. 1*s.* 5*d.* beyond the sum of £48,040. 5*s.*, deposits paid on shares in the subscribed capital of the Society. The income of the Society for 1851, arising from assurances and investments, was £23,802. 18*s.* 8*d.*

Equity and Law Life Assurance Society.—Annual General Meeting, held 11th March, 1853.—The report stated, that the amount of premiums on new assurances in 1852 had, with the exception of 1851, when the first premiums (amounting to £1142. 2*s.* 5*d.*) on the policies in the Etonian Assurance Office were received, exceeded that of any previous year. The sums received for new premiums, fines, and licenses, in 1852, were £4,318. 7*s.* 7*d.* The total amount of assurances effected to the 31st December last was £1,027,398, of which £804,397 is still assured.

The directors, acting in conformity with the determination announced in the report to the last general meeting, to effect reassurances only in cases of risk exceeding £5000, have discontinued reassurances in several cases; the effect of which has been to diminish this item of expenditure, as compared with the preceding year, by £351. 8*s.* 4*d.*, and to increase the receipts by £487. 12*s.* 2*d.*, the consideration for surrenders. In several particulars, the expenditure is less than that of the preceding year. The expenses of management, notwithstanding the increase of business, are less by £294. 4*s.* 4*d.*; the amount paid for the surrender of policies, by £149. 3*s.* 6*d.* The amount paid for claims by death, with the additions, is £2000 less than that for the preceding year, and less by £1066. 18*s.* 7*d.* than the receipts for new premiums, fines, and licenses. Exclusive of £463. 19*s.* received for deposits on shares, and £4,588. 7*s.* 4*d.* the consideration for annuities, the receipts for the year were £29,307. 5*s.* 2*d.*; the total charge, exclusive of annuities, £12,032. 7*s.* 5*d.*, showing a balance of £17,274. 17*s.* 9*d.*, or, including annuities, of £21,269. 10*s.* 1*d.*, in favour of the Society, and in augmentation of the reserved fund for meeting liabilities. The investments amounted, on the 31st December, 1852, to £120,124. 15*s.* 8*d.*, being an excess of £71,620. 11*s.* 6*d.* beyond the sum of £48,504. 4*s.* 2*d.*, deposits paid on shares in the subscribed capital of the Society. The income of the Society for 1852, arising from assurances, fines, licenses, and investments, was £28,286. 11*s.* 5*d.*, being an increase of £4,483. 12*s.* 9*d.* on that of the preceding year. The directors, having reason to think that the law by which proprietors are prohibited from holding more than 50 shares in the capital acted prejudicially to the interests of the Society, and all the shares being allotted, have resolved to recommend that the law be altered, so as to allow any proprietor to hold 100 shares instead of 50.

European Life Insurance and Annuity Company.—Sixty-second Annual General Meeting, held 3rd of May, 1852.—The statement made for the year 1850 was the most satisfactory one which had ever been laid before an annual meeting of this institution; but that for the past year is even more satisfactory. The accounts, as certified by the auditors, show that during the year 1851, new policies were completed insuring the sum of £223,005. 3*s.*, and representing new premiums to the amount of £7,085. 16*s.* 7*d.* Many of these insurances have been effected upon the half-yearly and quarterly system, and therefore the absolute new income represented by the above amount is £7,380. 17*s.* 11*d.* During the year 1851, the gross sum proposed to the Company was no less than £426,380. 2*s.*, of which

The amount completed was as above stated, viz. . . .	£223,005	3	0
The amount accepted, but not completed	64,495	0	0
The amount declined and not matured	112,273	0	0
The amount awaiting completion at the close of the year .	26,606	19	0
	£426,380	2	0

During the past year claims have been paid upon—

38 policies, insuring 33 lives. Total sum so paid amounts to (exceeding by £3,177. 0*s.* 7*d.* the amount paid under this head for the prior year.)	£27,053	0	5
12 policies have been surrendered, insuring	11,062	12	0
6 policies have expired, insuring.	9,150	0	0
47 policies have become forfeited, by non-renewal, insuring .	39,896	15	0

It thus appears that from the preceding four sources

103 policies have lapsed during the year, insuring . .	£87,162	7	5
And upon which the Company have paid for claims and surrenders	27,668	10	5

During the same period eight annuities have lapsed, upon which the Company were paying £574. 3*s.* 10*d.* per annum. The present value of this sum is £2,008. 18*s.* 4*d.* to the credit of the Company. The directors then recommend that an alteration should be made in the rules and regulations of the Company as to the declaration of future dividends, and that the dividend for the next half year should be increased from 10*s.* to 15*s.* per share.

Friends' Provident Institution.—Eighteenth Annual General Meeting, held July, 1851.—The following statement contains a summary of the transactions of the Institution, from its commencement to the 20th of 11th month, 1850, a period of 18 years:—

Receipts.

	£.	s.	d.
Net amount of single premiums	93,570	5	11
Ditto of periodical premiums	343,888	13	3
Interest on investments	108,829	2	2
Entrance moneys, &c.	1,438	11	5
	£547,726	12	9

Disbursements.

	£.	s.	d.
Annuities	54,976	11	7
Endowment assurances	11,718	15	3
Deferred sums	3,350	6	4
Life assurances	108,449	16	8
Purchase of policies	25,017	2	9
Returns on policies lapsed by deaths of parties before taking effect	1,223	15	11
Property tax	2,039	14	1
Bankers' commission	212	15	7
Printing and stationery	958	8	6
Other expenses (average £725. 2*s.* 3*d.* per annum) . .	13,052	1	7
Balance, being amount of property on 20th of 11th month, 1850	326,727	4	6
	£547,726	12	9

In the session of Parliament of 1850, an Act was passed "for consolidating and amending the Laws relating to Friendly Societies," by which no assurance in Class IX., effected in this Institution after the passing of the Act, can be made payable to a *nominee*, or to any other person than the widow or the widower, or the child or children, or the executors, administrators, or assigns of the member. The Act also takes away all exemption from stamp duty in respect of policies granted after the 15th of 8th month, 1850; but it contains an express provision that all policies granted previously to that date shall be entitled to all the powers, privileges, and exemptions which they possessed before the passing of the Act.

By another clause of this Act, the directors are authorized to advance money on loan to any member of the Institution, on security of any policy of assurance effected on his own life, provided the amount of any such loan

shall not exceed the actual estimated value of the policy at the time the loan is made.

Previous to this enactment, it was frequently a subject of regret to the directors that they did not possess the power to grant loans of this description, especially in cases where persons were under the necessity of disposing of their policies, thus sacrificing the provision which they had made for their surviving families, and which a timely advance of a small sum of money would have enabled them to retain. This enactment has already proved a convenience to a considerable number of members, who have availed themselves of the privilege; and loans have been granted on security of policies to the amount of £7,027, being an average of about £150 to each.

The number of deaths reported since the last general meeting is 27; viz., 2 deferred annuitants, 9 immediate annuitants (one of them being also a survivorship annuitant in Class X.), and 16 persons on whose lives assurances had been effected in Class IX. (one of these also being a survivorship annuitant in Class X.), making the total number of deaths, since the commencement of the Institution, 276; of these 147 have been in the department of life assurance, in which class the amount paid or accrued to the representatives of deceased parties has been upwards of £117,400.

Statement of Receipts and Payments from the 20*th of* 11*th Month*, 1849, *to the* 20*th of* 11*th Month*, 1850.

Receipts.

	£.	s.	d.
Balance on the 20th of 11th month, 1849	296,537	19	8
Single premiums received on assurances (agents' commission deducted)	5,433	2	7
Periodical premiums received on assurances (agents' commission deducted)	29,964	1	2
Entrance moneys	15	0	0
Interest on moneys invested with the National Debt Commissioners and on other securities	13,735	0	11
	£345,685	4	4

Payments.

	£.	s.	d.
Annuities, Class I.	467	10	0
Do. Class II.	380	0	0
Do. Class III.	4,357	16	4
Do. Class X. (survivorship)	25	0	0
Endowment assurances, Classes IV. & V., with bonuses	866	11	0
Ditto Class VI. ditto	219	1	0
Deferred sums, assured in Class VII. ditto	104	6	0
Ditto Class VIII. ditto	210	10	0
Life assurances, Class IX., on 14 lives ditto	8,254	0	0
Premiums returned on account of the death of a party subscribing for an assurance in Class VI.	26	6	6
Amount returned in purchase of policies by Institution	1,983	14	11
Printing and stationery	55	19	7
Bankers' commission	7	15	1
Income tax charged upon interest on investments	367	17	8
Expenses of management, including rent, salaries, postages, &c.	1,111	19	0
Receipt stamps	19	12	9
Balance in favour of the Institution on the 20th of 11th month, 1850	326,727	4	6
	£345,685	4	4

Statement of Funds and Effects belonging to the Institution on the 20th of 11th Month, 1850.

Property belonging to the Institution.

	£.	s.	d.
Principal invested with the Commissioners for the Reduction of the National Debt	42,300	1	9
Principal invested on real securities	271,949	4	9
Interest accrued thereon	3,854	15	8
Loans on policies	2,340	0	0
Interest accrued thereon	2	4	4
Policy and receipt stamps on hand	320	4	3
Balance at bankers in London	8,337	6	7
Balance in the hands of cashier	206	11	0
Balances due from agents and assurers	24	9	6
	£329,334	17	10

Debts owing by the Institution.	£.	s.	d.
Assurances fallen in, but not yet payable	2,500	0	0
Balance due to agents and assurers	107	13	4
Balance in favour of the Institution on 20th of 11th month, 1850	326,727	4	6
	£329,334	17	10

Friends' Provident Institution.—Nineteenth Report.—July, 1852.—The directors have again the satisfaction of reporting a continued state of prosperity in the affairs of the Institution, a steady accession of new assurances, and a proportionate increase of its capital, which has so far bee safely and profitably invested at a rate of interest which, they believe, will bear a favourable comparison with other Offices.

Since the passing of the Act of 1850 (13 and 14 Vic., c. 115) the sum of £12,170 has been advanced on loan to members of the Institution, on security of their policies.

The following statement contains a summary of the transactions of the Institution from its commencement to the 20th of the 11th month, 1851, a period of 19 years :—

Receipts.	£.	s.	d.
Net amount of single premiums	101,589	10	2
Ditto of periodical premiums	374,993	17	5
Interest on investments	124,036	3	1
Entrance moneys, &c.	1,438	11	5
	£602,058	2	1

Disbursements.	£.	s.	d.
Annuities	61,019	5	9
Endowment assurances	13,316	2	3
Deferred sums	4,103	14	4
Life assurances	125,769	9	8
Purchase of policies	26,198	0	8
Returns on policies lapsed by death of parties before taking effect	1,655	17	4
Property tax	2,424	12	9
Bankers' commissions	217	5	7
Printing and stationery	992	19	11
Other expenses (average £744. 18*s.* 10*d.* per annum)	14,153	18	7
Balance, being amount of property on 20th of 11th month, 1851	342,206	15	3
	£602,058	2	1

On the 20th of 11th month next, the Institution will have completed the 20th year of its operations; arrangements are in progress for making a division of the profits accrued in the five years ending on that day, when the directors expect to be able to make fresh assignments to all classes of policies, with the exception, perhaps, of those by which annuities are assured. In these classes it is still doubtful, notwithstanding the high rate of interest realized on the investments, whether the profits will yet be found sufficient to warrant a division. Of the persons now in receipt of annuities in Class III., only 14 are under 50 years of age; 170 are above 50; 143 are above 60; 74 are above 70; 39 are above 75; 11 are above 80; and 1 is upwards of 92 years of age.

The number of deaths reported since the last general meeting is 25, viz.: 1 deferred annuitant, 3 immediate annuitants, 6 children for whom endowments had been provided, 1 person who had contracted for a deferred sum, 13 persons on whose lives assurances had been effected in Class IX., and 1 on whose death a survivorship annuity has become payable to his widow in Class X., making the total number of deaths since the commencement of the Institution 301; of these, 172 have been in the department of life assurance, in which class the total amount paid or accrued to the representatives of deceased parties has been upwards of £129,000.

By the annexed statement it will be observed, that in the year ending 20th of 11th month last, 20 life assurances had fallen in, on which the sums assured amounted to £17,319. In the previous year there were 14 deaths in this class, on which the claims were only £8,254. With reference to this disparity, both in numbers and amounts, it seems only needful to remark that an excess or deficiency of claims in any one year has no very sensible effect on the general calculations; and in no year since the commencement of this Institution has the number of deaths equalled the expectation indicated by the table of mortality.

The total amount assured on policies in Class IX. existing at the date of this report is £1,222,575. 4*s.* 6*d.*, exclusive of bonuses.

The total number of policies which have been granted, from the opening of the Institution, in the 11th month, 1832, to 7th month, 1852, both inclusive, is as follows:—

	Policies.
Class I., deferred annuities	132
Class II., deferred annuities, with a condition annexed, making the premiums returnable without an interest, on the death of the annuitant before the assurance takes effect	125
Class III., immediate annuities (averaging £23. 16*s.* 7*d.* each)	343
Class IV., endowments for children, payable at 14	3
Class V., endowments payable at 21 or 25	74
Class VI., endowments payable at 14, 21, or 25, the premiums returnable as in Class II.	308
Class VII., deferred sums	64
Class VIII., deferred sums, the premiums returnable as in Class II.	103
Class IX., life assurance (averaging about £658 each)	2,385
Class X., survivorship annuities	26
Total number of policies	3,563

Statement of Receipts and Payments, from the 20th of 11th month, 1850, *to the 20th of 11th month,* 1851.

Receipts.	£.	s.	d.
Balance on the 20th of 11th month, 1850	326,727	4	6
Single premiums received on assurances (agents' commission deducted)	8,019	4	3
Periodical premiums received on assurances (agents' commission deducted)	31,105	4	2
Interest on moneys invested with the National Debt Commissioners and other securities	15,207	0	11
Payments.			
Annuities, Class I.	543	15	0
Ditto, Class II.	432	10	0
Ditto, Class III.	5,041	9	2
Ditto, Class X. (survivorship)	25	0	0
Endowment assurances, with bonuses, Class VI.	1,597	7	0
Deferred sums assured in Class VII., with ditto	409	18	0
Ditto, Class VIII., with ditto	343	10	0
Life assurances, Class IX., on 20 lives, with ditto	17,319	13	0
Premiums returned on account of the death of the parties assured in Classes VI. and VIII.	432	1	5
Amount returned in purchase of policies by Institution	1,180	17	11
Printing and stationery	34	11	5
Bankers' commission	4	10	0
Income tax charged upon interest on investments	384	18	8
Expenses of management, including rent, salaries, postage, &c.	1,067	2	4
Receipt stamps	34	14	8
Balance in favour of the Institution on the 20th of 11th month, 1851	352,206	15	3
	£381,058	13	10

Statement of Funds and Effects belonging to the Institution on the 20th of 11th month, 1851.

Property belonging to the Institution.	£.	s.	d.
Principal invested with the Commissioners for the Reduction of the National Debt	66,551	0	2
Principal invested on real securities	270,355	0	0
Interest accrued thereon	3,874	16	3
Loans on policies	8,791	18	4
Interest accrued thereon	130	4	9
Policy and receipt stamps on hand	206	7	0
Balance at bankers, in London	4,360	2	2
Balance in the hands of secretary	1,722	8	4
Balance due from agents and assurers	62	7	2
	£356,054	4	2
Debts owing by the Institution.	£.	s.	d.
Assurances fallen in, but not yet payable	3,786	0	0
Balance due to agents and assurers	61	8	11
Balance in favour of the Institution on the 20th of 11th month, 1851	352,206	15	3
	£356,054	4	2

General Annuity Endowment Association.—The adjourned annual meeting of this Association (adjourned from the 7th of February) was held October, 1851. The questions left for decision were, whether the Society should continue to issue shares to old members, and whether it should also

receive new members. In accordance with the opinion of Mr. Tidd Pratt, which was read to the meeting from the chair, the meeting, on the motion of the chairman, adopted a resolution, declaring that persons who were members of the Association prior to the 15th August, 1850, should be allowed to take the additional shares to which they were entitled under the rules, paying a stamp duty if it should be considered legally necessary. The opinion of Mr. Neison, the actuary, having been expressed, both in writing and orally, to the effect that it would prove most advantageous to the old members to admit new ones, and Mr. Tidd Pratt having declared the legality of such a course, a resolution in favour of their admission was carried by a large majority. A vote of thanks to the chairman terminated the proceedings.—*Post Magazine.*

General Hail Storm Insurance Company.—Seventh Annual Meeting of the Shareholders, held January, 1851.—The report stated that the bonus declared out of the profits of the Society to 1849, paid to the insurers of the past season, was as satisfactory as it was unexpected by them. The amount received in cash by several of the insurers exceeded their present year's premium. The directors had reduced the rate of insurances from 8*d.* an acre—with a limited payment in case of loss—to 6*d.* per acre, without regard to the quantity grown, or the price per quarter to be paid as compensation in case of loss; and from its past success they recommend the same course to be adopted in the season of 1851. The business of last season had increased 25 per cent. beyond the addition of 1849.

Gresham Life Assurance Society.—Second Annual General Meeting of the Proprietors and Policyholders, held October, 1850.—The report stated that during the second year of the Society's operations, expiring 31st July last, the number of proposals was 1,006 for assurances, amounting to £491,435. 10*s.* Of these 501 were accepted and completed, assuring £219,040. 11*s.*, producing in annual premiums £8,281. 2*s.* 1*d.*

The number of assurances in force at the end of July last, allowing for lapsed and other discontinued policies, is 845, assuring £342,490. 7*s.*, and producing an annual income of £13,058. 13*s.* 11*d.* The majority are on first class lives assured at the tabular rates; the remaining portion pay extra rates, being considered by the directors to be somewhat below the average standard of health.

From the operations of the second year the directors have been enabled to add £600 to the Society's rest. The entire subscribed capital remains intact.

The investments of the Society at the close of the first year amounted to £7,454. 15*s.*, and at the expiration of the second year to £18,172. 17*s.* 2*d.*

Gresham Life Assurance Society.—Third Annual General Meeting, held October, 1851.—The report announced a large accession of new assurances—as, from 1,065 proposals for assurance, amounting to £411,630. 19*s.*, received in the period comprising the third year, ending July 31st last, 454 policies were completed, assuring £164,653. 15*s.*, the annual premiums receivable therefrom being £5,124. 3*s.* 4*d.* Several proposals were still under consideration at the above date, and the remainder were either declined or not taken up by the parties at the rates proposed.

With respect to claims, the directors in their last report intimated that the singular exemption experienced by the Gresham during the first two years could not be expected to continue, but that the Company must be prepared to meet the same rate of mortality as that experienced in other Offices transacting a similar business.

The gross amount paid to the representatives of deceased members from the establishment of the Society amounts to £8,471. 2*s*. 6*d*., showing an average for the three years ending 31st July last of £2,823. 14*s*. 2*d*.

Gross amount paid to representatives of deceased members from the establishment of the Society	£8,471	2	6
Deduct amount received in the same period for policies lapsed or otherwise discontinued	4,658	6	0
Net amount paid for claims	3,812	16	6
Gross number of policies effected during the three years, 1,373, assuring	532,555	2	0
Premiums received thereon	33,640	4	8
Number of assurances now in force 1,160, assuring . .	452,505	7	0
Annual premiums receivable from premiums alone . .	15,152	9	0

The directors have for a considerable period declined acceding to applications for the allotment of shares, except in a few instances, where the co-operation of influential persons was calculated to promote the prosperity of the Office by co-operation.

With regard to proposals for the assurance of declined lives, your directors very carefully consider every single case which is offered to them, in order that the advantages of life assurance may be afforded to the individual, wherever it is practicable, at moderate rates. During the past year, however, the directors have resolved to limit the assurance of lives to persons who are strictly temperate in their habits, inasmuch as they find a very high and uncertain mortality appertains to those who are in the slightest degree addicted to intemperance.

Although the ratio of mortality is unquestionably higher amongst the declined than the healthy lives, the directors have much pleasure in stating that this branch of their business shows a highly satisfactory result. Many who were assured in the first years of the society at an advanced rate, have during this year, on re-examination, been found to have attained so improved a standard of health as to enable the directors to reduce, and in some cases to remit the entire, extra premium.

During the past year the directors have made every exertion to extend the first-class department of the business, and their efforts have been so far successful that a considerable majority of all the lives assured are of this character.

The directors have the gratification to announce that the prospects of the current year are most encouraging, as during the two months just elapsed more new assurances have been completed than at the corresponding period of any previous year.

The chairman, in moving the adoption of the report, called attention to the fact that in the third year of their existence the large sum of nearly £16,000 had been received; that the sums received for lapsed policies went a long way towards discharging the amount of claims for death; and after discharging all liabilities in respect of these claims, there was a balance of £25,000 in hand.

A member objected to the amount paid to the medical officers of the Society; but it was shown that these gentlemen had examined 3,400 cases, and that the average cost in each case was less than seven shillings.

The consulting actuary, in explaining to the meeting the position of the Society, observed that whilst the entire liabilities of the Company amounted to £470,000, the value of their present income was £500,000; and in addition they had £25,000 in hand. The average ages of the assured were of the most favourable kind, ranging between 30 and 32. In reference to the objection that had been urged against the directors for the payment of £800 under the head of preliminary expenses, it should be borne in mind that under the provisions of the deed of settlement not more than one-fourth of the expenses incurred in establishing the Society during the first seven years of its existence would be carried to account at the first division of profits to be declared in 1855—the remaining three-fourths would be spread over an extended period.

Votes of thanks were then passed to the auditors, with £45 for their services; and to the directors and officers of the Society.

INSTITUTE OF ACTUARIES.

PROCEEDINGS OF THE INSTITUTE.

Fifth Ordinary Meeting, Session 1852-53.—*Tuesday,* 22*nd March,* 1853.

PETER HARDY, Esq., V.P., in the Chair.

The Minutes of the Special General Meeting were read and confirmed.

The Minutes of the last Ordinary Meeting were also read and confirmed.

The Secretary announced various donations to the Library.

The following Candidates, duly nominated at the last Ordinary Meeting, were elected Associates of the Institute, viz.:—

J. B. Allan.	Henry Fache.
C. V. Boddy.	Edward Laing.

Mr. Farren, V.P., read a paper "On the Reliability of Data when tested by the conclusions to which they lead."

A discussion followed, in which Mr. Lodge, Mr. Pinckard, Mr. Hodge, Mr. Jellicoe, V.P., Mr. S. Brown, Mr. Colvin, Mr. Farren, V.P., and the Chairman, bore part.

Special General Meeting.—Tuesday, 12*th April,* 1853.

Present:—

JOHN FINLAISON, Esq., President, in the Chair, and 73 other Members.

Read Circular convening the Meeting.

The President briefly stated the objects of the Meeting.

Mr. Jellicoe, V.P., explained the reasons which had induced the Council to call the Special General Meeting.

After a discussion, in which Mr. Jenkin Jones, Mr. Bunyon, Mr. Gover, Mr. George Scott, Mr. Robertson, and Mr. Lodge, took part, it was resolved:

"That the Meeting do adjourn to Tuesday next, the 19th of April instant, at six o'clock, p.m."

The thanks of the Meeting were then voted to the Chairman, and the Meeting adjourned.

Adjourned Special General Meeting.—Tuesday, 19th April, 1853.

Present:—

JOHN FINLAISON, Esq., President, in the Chair, and 66 other Members.

After a lengthened discussion, in which several Members took part, it was resolved:

"That the Act of 1844 has created an invidious distinction between the Offices established prior to 1844, and those established since; and that the Act in question ought to be forthwith repealed, and provision made for putting all existing Offices on an equal footing."

"That whilst this Meeting recognises the propriety of allowing the competition in business of life assurance to remain unrestricted, it cannot lose sight of the fact that a rate of expenditure much greater than was formerly necessary is thereby occasioned; and this Meeting is therefore of opinion that every Company to be hereafter established should be required, before commencing business, to prove the possession and investment in government securities of a capital of at least £10,000 (under conditions similar to those imposed in the case of Joint Stock Banks), as some guarantee to the public of its ability, under present circumstances, to carry out the contracts which it may enter into."

"That, in the opinion of this Meeting, no legislation on Life Assurance Associations can be permanently effective that does not exact tests as to the respectability and acquirements of persons allowed to practise as actuaries."

A vote of thanks was then passed to the Chairman, and the Meeting separated.

Sixth Ordinary Meeting, Session 1852-53.—*Monday, 25th April,* 1853.

CHARLES JELLICOE, Esq., V.P., in the Chair.

The Minutes of the adjourned Special General Meeting were read and confirmed.

The Minutes of the last Ordinary Meeting were also read and confirmed.

The Secretary announced several valuable donations to the Library.

W. F. Goguel was elected an Associate of the Institute.

A paper by Mr James Meikle, "On the Theory of Progressive Mortality, and its application to Valuations," was then read, and the Meeting adjourned to Monday, 30th May.

Seventh Ordinary Meeting, Session 1852-53.—*Monday, 30th May,* 1853.

JOHN FINLAISON, Esq., President, in the Chair.

The Minutes of the last Meeting having been read and confirmed, the Secretary announced various donations to the Library.

The following Candidates, duly nominated at the last Ordinary Meeting, were elected Associates of the Institute:—

Official Associate—James Knight.

Associate—W. F. Birkmyre.

Mr. Bunyon, M.A., read a paper "Concerning the Renewal of Leaseholds for Lives or Years that have been the subject of Settlement," and the Meeting adjourned to Monday, 27th June.

ORIGINAL TABLES.

It has been suggested that the devoting a few pages of this Journal from time to time to the publication of original and authentic tables would be the means of bringing to light a vast number of very useful ones now inaccessible to all but their owners. Believing this suggestion to be a judicious one, we propose to act upon it, and commence by inserting the following five tables, based upon the "Equitable" Experience, and kindly furnished by Mr. Peter Hardy, whose name we do not doubt will be received as a sufficient guaranty for their correctness.

Should any of our readers be willing to place computations of the like sort at our disposal, we shall be happy to give them insertion. They will thus benefit the profession, and have what is their own secured to them in a more convenient form. We need hardly add, that we can publish only such tables as are authentic and have not appeared in print before.

TABLE I.

Showing the Probabilities of Living amongst the Members of the "Equitable" Society, as given in Table A, comprising all Lives ever assured, and all Policies, from 1762 *to* 1829.

Age.	Number Living.	Decrement.	Age.	Number Living.	Decrement.	Age.	Number Living.	Decrement.	Age.	Number Living.	Decrement.
10	5,000	36	32	4,235	36	54	3,234	64	76	1,111	109
11	4,964	36	33	4,199	37	55	3,170	66	77	1,002	105
12	4,928	36	34	4,162	38	56	3,104	70	78	897	101
13	4,892	36	35	4,124	38	57	3,034	75	79	796	96
14	4,856	36	36	4,086	39	58	2,959	79	80	700	93
15	4,820	36	37	4,047	40	59	2,880	84	81	607	90
16	4,784	36	38	4,007	42	60	2,796	88	82	517	85
17	4,748	36	39	3,965	43	61	2,708	90	83	432	83
18	4,712	36	40	3,922	43	62	2,618	91	84	349	73
19	4,676	35	41	3,879	44	63	2,527	93	85	276	61
20	4,641	34	42	3,835	44	64	2,434	95	86	215	50
21	4,607	33	43	3,791	44	65	2,339	100	87	165	42
22	4,574	33	44	3,747	45	66	2,239	105	88	123	34
23	4,541	33	45	3,702	47	67	2,134	108	89	89	22
24	4,508	33	46	3,655	47	68	2,026	111	90	67	18
25	4,475	34	47	3,608	48	69	1,915	115	91	49	14
26	4,441	34	48	3,560	49	70	1,800	115	92	35	11
27	4,407	34	49	3,511	50	71	1,685	115	93	24	8
28	4,373	34	50	3,461	52	72	1,570	115	94	16	7
29	4,339	34	51	3,409	55	73	1,455	115	95	9	5
30	4,305	35	52	3,354	58	74	1,340	115	96	4	3
31	4,270	35	53	3,296	62	75	1,225	114	97	1	1

TABLE II.

Showing the Logarithm of the Numbers living at each Age.
"Equitable" Table A.

Age.	Logarithm.	Age.	Logarithm.	Age.	Logarithm.	Age.	Logarithm.
10	3·6989700	32	·6268534	54	·5097400	76	3·0457141
11	·6958318	33	·6231459	55	·5010593	77	3·0008677
12	·6926707	34	·6193021	56	·4919217	78	2·9527924
13	·6894864	35	·6153187	57	·4820156	79	·9009131
14	·6862787	36	·6112984	58	·4711450	80	·8450980
15	·6830470	37	·6071332	59	·4593925	81	·7831887
16	·6797912	38	·6028193	60	·4465372	82	·7134905
17	·6765107	39	·5982432	61	·4326487	83	·6354837
18	·6732053	40	·5935076	62	·4179696	84	·5428254
19	·6698745	41	·5887198	63	·4026052	85	·4409091
20	·6666116	42	·5837654	64	·3863206	86	·3324385
21	·6634182	43	·5787538	65	·3690302	87	·2174839
22	·6602962	44	·5736837	66	·3500541	88	·0899051
23	·6571515	45	·5684364	67	·3291944	89	1·9493900
24	·6539839	46	·5628874	68	·3066394	90	·8260748
25	·6507930	47	·5572665	69	·2821688	91	·6901961
26	·6474808	48	·5514500	70	·2552725	92	·5440680
27	·6441431	49	·5454308	71	·2265999	93	·3802112
28	·6407795	50	·5392016	72	·1958997	94	·2041200
29	·6373897	51	·5326270	73	·1628630	95	0·9542425
30	·6339732	52	·5255631	74	·1271048	96	0·6020600
31	·6304279	53	·5179872	75	·0881361	97	0·0000000

TABLE III.

Showing the Probability of a given Life existing One Year.
"Equitable" Table A.

Age.	Prob.	Age.	Prob.	Age.	Prob.	Age.	Prob.	Age.	Prob.
10	·9928	28	·9922	46	·9871	64	·9609	81	·8517
11	·9927	29	·9921	47	·9867	65	·9572	82	·8355
12	·9926	30	·9918	48	·9862	66	·9531	83	·8078
13	·9926	31	·9918	49	·9857	67	·9493	84	·7908
14	·9925	32	·9915	50	·9849	68	·9452	85	·7789
15	·9925	33	·9911	51	·9838	69	·9399	86	·7674
16	·9924	34	·9908	52	·9827	70	·9361	87	·7454
17	·9924	35	·9907	53	·9811	71	·9317	88	·7235
18	·9923	36	·9904	54	·9802	72	·9267	89	·7528
19	·9923	37	·9901	55	·9791	73	·9209	90	·7313
20	·9926	38	·9895	56	·9774	74	·9141	91	·7142
21	·9928	39	·9891	57	·9752	75	·9069	92	·6857
22	·9927	40	·9890	58	·9733	76	·9018	93	·6666
23	·9927	41	·9886	59	·9708	77	·8952	94	·5625
24	·9926	42	·9885	60	·9685	78	·8874	95	·4444
25	·9924	43	·9883	61	·9667	79	·8794	96	·2500
26	·9923	44	·9879	62	·9652	80	·8671	97	·0000
27	·9922	45	·9873	63	·9632				

TABLE IV.—*Showing the Present Value of an Annuity of £1 per annum on a Single Life at 3 per cent.—"Equitable" Table A.*

Age.	Value.	Age.	Value.	Age.	Value.	Age.	Value.	Age.	Value.
10	23·302	28	20·240	46	15·303	64	8·854	81	3·489
11	23·176	29	20·011	47	14·967	65	8·490	82	3·219
12	23·045	30	19·774	48	14·624	66	8·135	83	2·968
13	22·911	31	19·534	49	14·273	67	7·792	84	2·784
14	22·773	32	19·286	50	13·913	68	7·453	85	2·626
15	22·632	33	19·036	51	13·549	69	7·122	86	2·456
16	22·486	34	18·781	52	13·189	70	6·804	87	2·332
17	22·336	35	18·522	53	12·819	71	6·486	88	2·203
18	22·182	36	18·256	54	12·457	72	6·170	89	2·067
19	22·024	37	17·984	55	12·090	73	5·858	90	1·892
20	21·856	38	17·709	56	11·717	74	5·551	91	1·720
21	21·677	39	17·433	57	11·347	75	5·255	92	1·501
22	21·489	40	17·153	58	10·984	76	4·968	93	1·902
23	21·294	41	16·864	59	10·624	77	4·673	94	0·839
24	21·094	42	16·569	60	10·271	78	4·377	95	0·536
25	20·887	43	16·264	61	9·923	79	4·080	96	0·243
26	20·678	44	15·949	62	9·572	80	3·779	97	0·000
27	20·463	45	15·627	63	9·215				

TABLE V.—*Showing the Present Value of a Reversion of £100, and the corresponding Annual Premiums on a Single Life at 3 per cent.—"Equitable" Table A.*

Age.	Value of Reversion.	Annual Premium.	Age.	Value of Reversion.	Annual Premium.	Age.	Value of Reversion.
10	29·216	1·202	39	46·310	2·512	68	75·379
11	29·585	1·224	40	47·126	2·596	69	76·345
12	29·965	1·246	41	47·969	2·685	70	77·270
13	30·356	1·269	42	48·828	2·779	71	78·195
14	30·757	1·294	43	49·716	2·880	72	79·115
15	31·169	1·319	44	50·634	2·987	73	80·025
16	31·593	1·345	45	51·572	3·102	74	80·918
17	32·029	1·372	46	52·516	3·221	75	81·782
18	32·478	1·401	47	53·493	3·350	76	82·618
19	32·940	1·431	48	54·493	3·488	77	83·476
20	33·430	1·463	49	55·516	3·635	78	84·319
21	33·949	1·497	50	56·562	3·793	79	85·203
22	34·498	1·534	51	57·623	3·961	80	86·080
23	35·065	1·573	52	58·685	4·137	81	86·925
24	35·649	1·613	53	59·750	4·324	82	87·711
25	36·252	1·656	54	60·805	4·518	83	88·442
26	36·860	1·700	55	61·874	4·727	84	88·978
27	37·487	1·745	56	62·959	4·951	85	89·438
28	38·135	1·795	57	64·037	5·189	86	89·933
29	38·803	1·847	58	65·095	5·432	87	90·294
30	39·493	1·901	59	66·144	5·690	88	90·670
31	40·191	1·957	60	67·170	5·960	89	91·066
32	40·913	2·017	61	68·184	6·242	90	91·577
33	41·644	2·078	62	69·296	6·546	91	92·078
34	42·386	2·143	63	70·248	6·877	92	92·715
35	43·140	2·210	64	71·299	7·235	93	93·621
36	43·916	2·281	65	72·359	7·625	94	94·649
37	44·705	2·355	66	73·392	8·034	95	95·525
38	45·508	2·432	67	74·393	8·461	96	96·380

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